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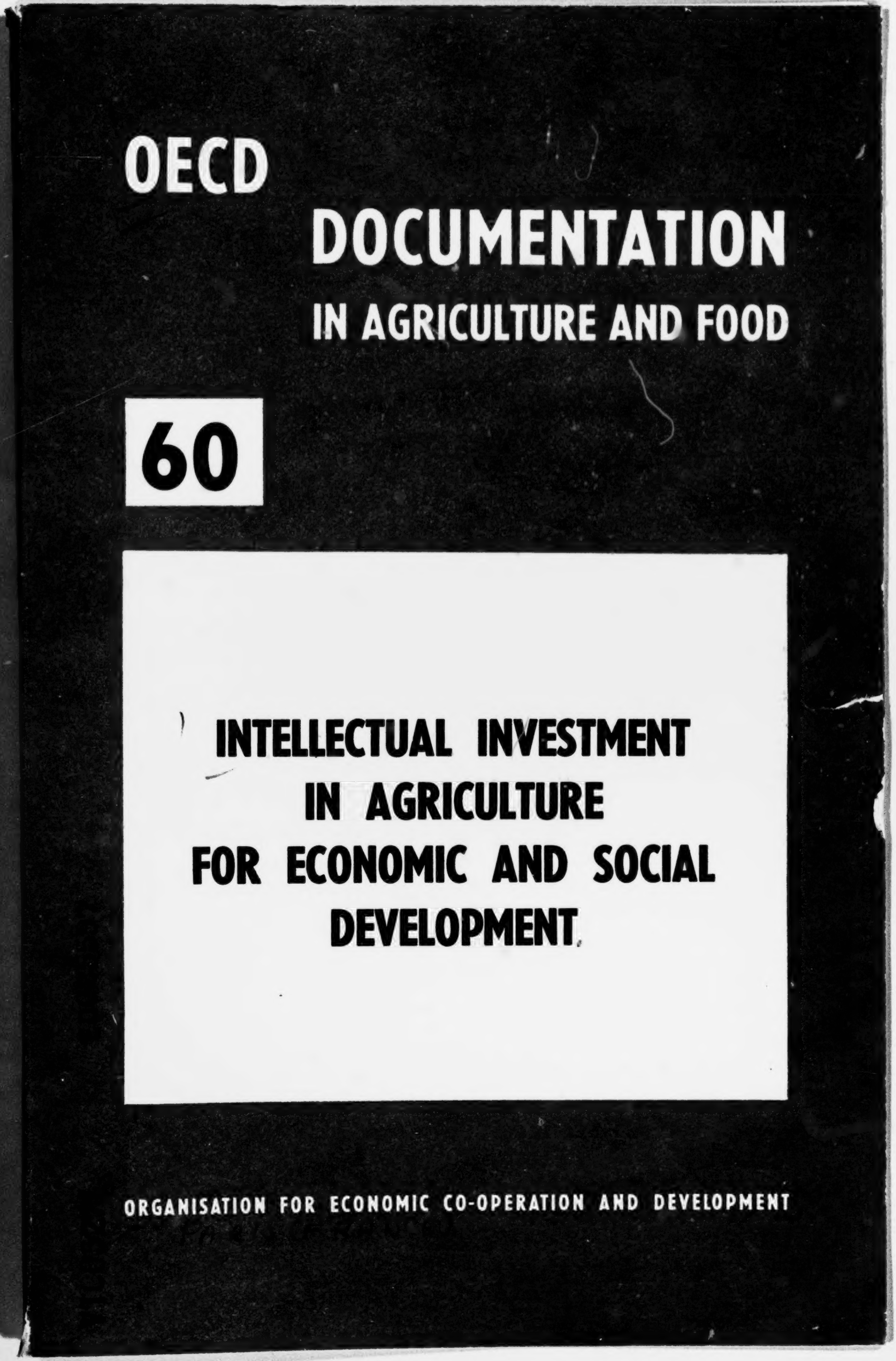
In a project of agricultural research, education, and advice for economic growth and development, data was obtained from 14 countries and summarized with implications for action. Chapters in the report discuss: (1) Intellectual Investment and Economic and Social Development, (2) Intellectual Investment in Agriculture, (3) Agronomic Research, (4) Agricultural Education, (5) Informing Farmers, (6) Other Forms of Intellectual Investment, (7) Economic Growth and Intellectual Investment in Training for Occupational Changes, (8) The Planning of Intellectual Investment, (9) Coordination of Action, and (10) International Exchange of Knowledge and Technical Cooperation. The appendixes contain statistics of intellectual investment in agriculture, a summary report of a seminar on the structure and orientation of intellectual investment in agriculture, and a summary report of an ad hoc meeting of experts on the problems of Mediterranean countries. (DM)



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INTELLECTUAL INVESTMENT IN AGRICULTURE FOR ECONOMIC AND SOCIAL DEVELOPMENT

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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INTELLECTUAL INVESTMENT IN AGRICULTURE FOR ECONOMIC AND SOCIAL DEVELOPMENT

Published by the

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The Organisation for Economic Co-operation and Development was set up under a Convention signed in Paris on 14th December 1960 by the Member countries of the Organisation for European Economic Co-operation and by Canada and the United States. This Convention provides that the O.E.C.D. shall promote policies designed :

- *to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy ;*
- *to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development ;*
- *to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.*

The legal personality possessed by the Organisation for European Economic Co-operation continues in the O.E.C.D., which came into being on 30th September 1961.

The Members of O.E.C.D. are : Austria, Belgium, Canada, Denmark, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

This publication forms part of a project adopted by the European Productivity Agency in 1962 under No. 18/01.

The E.P.A., which was an integral part of O.E.E.C., ceased to exist on 30th September 1961, when the Convention of O.E.C.D. came into effect. Since this project was in course of execution at that date, the Council of the O.E.C.D. decided to bring the project to completion.

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In publishing this report, the Organisation for Economic Co-operation and Development wishes to express its best thanks to the French authorities and the Ministry of Agriculture for France for making available Mr. L. Malassis, Professor of Agricultural Economics at the Ecole Nationale Supérieure d'Agronomie of Rennes, to act as Consultant for the work. Professor Malassis' excellent pioneering work will do much to further and develop the interest and efforts of all countries in the field of intellectual investment in agriculture : it has given an invaluable impetus to the objectives of the O.E.C.D. Committee for Agriculture which sponsored the activity.

The Organisation also wishes to express its appreciation to the country rapporteurs, and the participants to the Seminar at which this report was considered, for all the assistance they so willingly gave.

Finally, the Organisation's thanks are due to those other international Organisations (E.E.C., F.A.O., UNESCO, I.L.O. International Association of Universities) which so readily made available to Professor Malassis information on the individual studies carried out by them on the various forms of intellectual investment.

INTRODUCTION

I. The Ministerial Council of O.E.C.D. met in Paris on the 16th and 17th November 1961, to survey the economic prospects of the vast community of Member nations comprising more than five hundred million people in Europe and North America.

The Ministers fixed as a collective target the achievement between 1960 and 1970 of a growth of 50 per cent in the real gross national product of the twenty Member countries combined.

They underlined that, in order to achieve the growth target, increasing use of scientific training and research is needed. They invited the Organisation to develop its work in this field, both in agriculture and in industry.

The present project concerns agricultural research, education and advice, considered in relation to economic growth and development.

II. The tasks of the consultant were defined as follows:

1. To establish an "essay in synthesis" on the studies undertaken in agricultural research, education and advice by the major international organisations (UNESCO, F.A.O., I.L.O., E.E.C., O.E.C.D.), and also by the international or national institutes specialising in the study of intellectual investment as a whole.
2. To make a comparison of the extent and structure of intellectual investment (number of specialists and funds devoted to all investment, and the different forms of investment) as well as the principles which govern such investment in Member countries.
3. To make a study and comparison of experiences in the co-ordination and planning of intellectual investment in agriculture in relation to the social perspectives and the development of agriculture within the overall economy.
4. To contribute to defining orientated action aimed to intensify and increase the efficacy of intellectual investment, particularly in countries in the process of economic development.

III. During 1961 contact was made with, or visits paid to, the Headquarters of UNESCO, F.A.O., E.E.C., I.L.O., the International Association of Universities and the O.E.C.D. Directorate for Scientific

Affairs. The visits and contacts showed that, although numerous individual studies on various forms of intellectual investment are available, few comprehensive studies have been made.

The work of the O.E.C.D. Directorate for Scientific Affairs and of the International Association of Universities, particularly those which concern investment in education in relation to policies for economic growth in Europe, are of great value to us. Considerable use has been made of the two works named below in the preparation of this present report :

— Policy Conference on Economic Growth and Investment in Education : II. Targets for Education in Europe in 1970, Ingvar SVENNILSON, Friedrich EDDING, Lionel ELVIN (O.E.C.D. 1962).

— "Some Economic Aspects of Educational Development in Europe", International Association of Universities, 1961, 6, rue Franklin, Paris XVI^e.

The Division for Technical Action of the Directorate for Agriculture and Food of O.E.C.D. (formerly O.E.E.C.) has organised many meetings, seminars and conferences on the various forms of intellectual investment in agriculture and has published many documents concerning such investments, either in the Agriculture and Food Documentation Series or in the FATIS Review. All this documentation has been consulted.

IV. The documentation available in the international field was completed by a survey in Member countries of O.E.C.D. During 1961 a questionnaire on orientation (A) and a detailed questionnaire (B) was addressed to rapporteurs in each Member country. The main objective of these questionnaires was to collect documentation for a comparison of the amount and orientation of investment in Member countries. That part of the questionnaire which concerned agronomic research was drawn up in consultation with the competent services of the European Economic Community, which has carried out a detailed study in its six Member countries. As was foreseen, taking account of the numerous forms of intellectual investment in agriculture and the dispersal of action, such documentation has proved very difficult to collect. Available statistics are both fragmentary and dispersed and their comparison gives rise to great difficulties. We should thus aim to improve this documentation in future if we are to direct and encourage what is one of the principal forces for economic and social growth and development.

V. The analysis of the documentation was completed by visits to many countries : Canada, Germany, Greece, Ireland, Italy, the Netherlands, Turkey, the United Kingdom and Yugoslavia. Selection of countries took account of the information available and their degree of development. In each country visited discussions were held with the directors of agricultural research, education and advisory services; with the directors of services for planning or economic studies; those responsible for youth movements and many other persons.

The discussions proved very fruitful, and it is hoped that all essentials have been obtained and have been included in the following pages.

VI. The preliminary report, completed in February 1962, was distributed by O.E.C.D. and submitted as a draft for discussion and information to:

a) The ad hoc meeting of experts on the "Specific problems of Mediterranean countries in the field of intellectual investment in agriculture" (Paris, 7th and 8th June, 1962). The summary report of this meeting will be found at Annex III of the present publication.

b) The Seminar on the "Structure and orientation of intellectual investment in agriculture" (Paris, 22nd to 26th October 1962). The summary report of this Seminar will be found in Annex II of the present publication.

c) The Second European/North American Working Conference representatives of higher agricultural education (Paris, 12th to 16th November, 1962).

The author also participated in the O.E.C.D. expert meeting on the "Mobility of agricultural manpower in relation to economic growth" and the O.E.C.D. training course on planning education for economic and social development (Frascati, Italy, 3rd to 28th September, 1962). The meeting on the mobility of agricultural manpower proposed the inclusion of a chapter on "Intellectual investment in occupational changes"; the training course at Frascati enabled considerable documentation to be assembled and showed the important relationship between overall programming of intellectual investments and planning of intellectual investment in agriculture.

VII. Whilst the preliminary report has been enriched by the many discussions and observations made, this final report is solely the responsibility of the author. Given the extent of the subject, and the fact that the present synthesis was undertaken for the first time, this report most certainly still contains lacunae. It will be remedied and completed later if it is considered, as we hope, that such a synthesis is useful. It has not been possible to mention all the country variations; we have confined ourselves to the fundamental tendencies of intellectual investment in agriculture in relation to economic growth.

VIII. "Intellectual investment" has intentionally been taken as the title of this report. By this title we wish to stress that we are considering essentially the economic aspects of education. In doing so only one aspect of education has been dealt with. Education is much more than an economic investment and this has not been totally lost sight of. If intellectual investment is governed by the "economic results expected", it must also satisfy the desires for social equality, and at the same time ensure economic and social development.

⁂

IX. The author wishes to sincerely thank the Organisation for Economic Co-operation and Development for making it possible for him to undertake this task. In particular he wishes to thank the staff of the Division for Technical Action of the Directorate for Agriculture and Food who have facilitated his task ; the national rapporteurs ; the staff of international organisations visited ; and those who, in the various countries, facilitated his mission and made his stay so agreeable.

Introductory chapter

INTELLECTUAL INVESTMENT AND ECONOMIC AND SOCIAL DEVELOPMENT

1. Economists, and all those responsible for improving the well-being of populations, are increasingly concerned with growth and development. The evolution of well-being is linked with the development of production and international trade, which leads to an improvement in the quantity, quality and variety of goods and services. The rate of growth of the national product during a given period tends to become a basic index for estimating countries' economic development, and a basis of reference in the competition between different social and economic systems. During the period 1951-1960, the internal gross product at constant prices for all Member countries of O.E.E.C. increased at an annual average rate of 4.5 per cent during 1950-1955, and of 3 per cent during 1955-1960.

2. The explanation of these differences in the growth rates is compounded of several factors. When measured over a relatively short period these rates depend, *inter alia,* on the level of development achieved during the year of reference. When analysing the growth process economists attach considerable importance to the distribution of income (I) between consumption (C) and investment (IN). The following formula expresses a basic relationship :

$$I = C + IN \qquad (I)$$

The volume and pattern of investment compared with income indicate the rate of expenditure on improvements to the productive capacity of an economic group. During the period 1950-1960, the average rate of investment in O.E.E.C. countries was about 20 per cent.

3. When economists speak of "investment", in most cases they mean "material investment". Much of their time is spent in considering the amount, form and order of priority of material investment, and everything proceeds as if the formation and utilisation of intellectual capital and the development of our inventive capacity was, as it were, quite unrelated to the economy, wheras it is obvious that to-morrow's economy is being shaped in the schools and laboratories being built today. Much more attention has been given to the process

of accumulating capital (material) than to the process of accumulating knowledge. But if there is "no wealth without men", economic development is dependent in the final analysis on men's aptitude to discover the ways and means of progress.

For some years past, however, increasing attention has been given to the economics of education. Economists have become interested in the cost and productivity of education, in forecasts of the evolution of employment and in training plans, etc. Thanks to these studies it is gradually becoming possible to integrate education into the theory of economic and social development[1]. The formula (I) which opposes consumption to investment, and which implies that to ensure growth consumption must be reduced and income increased, does not correspond to reality if consumption and income are calculated on the basis of a systematic division of goods into two categories — production and consumption. It has been proved that in countries where the populations are underfed, an increase in food consumption greatly helps to increase production, and there seems to be no doubt that the development of vocational training is a factor in economic growth.

4. Professor Ingvar SVENNILSON[2] has expressed the twofold character of education in the formula :

$$I = C + E + IN \qquad \text{(II)}$$

Here E represents "educational expenditure", which constitutes both *consumption expenditure* and *productive investment.*

Consumption expenditure, because education contributes to the development of personality, influences the mode of life and is the noblest form of "investment in men" (T. SCHULTZ). Men need to know, to reason, to understand. As a consumption commodity, education is lasting, it can continue to be consumed throughout the lifetime of an individual and has cumulative effects, for knowledge already acquired permits the acquisition of further knowledge.

Productive investment, because technical training enables better use to be made of available resources and new ones to be created. The professional capacity of the individual, as well as his standard of living is improved. The nation's productive capacity, as well as productivity in general, is increased[3].

5. Professor EDDING has pointed out that a certain number of misunderstandings existed between educationists and economists, and that a serious attempt should be made to achieve a better mutual

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[1] The Directorate for Scientific Affairs (O.E.C.D.) has prepared a bibliography of publications dealing with the "Economics of Education". (OST/PP/61/21) Paris, 1961.

[2] The Concept of Economic Growth. International Journal of Agrarian Affairs, April, 1961, page 54.

[3] Ingvar SVENNILSON, F. EDDING, L. ELVIN : Targets for Education in Europe in 1970 (page 22 et seq.).

understanding[1]. For many educationists, economics belongs to the realm of the material world and of self-interested activity, whereas education is concerned with spiritual, interior values and is a field of disinterested activity. The individual who has received his training from educationists of this outlook will possibly continue to regard real life as lying outside his economic activity, and to treat his working day as an unavoidable concession to the lower needs of life. It is obvious that a synthesis must be made, that the two worlds of thought must confront each other, and an attempt be made to establish a better mutual understanding between educational theory and practice and economic theory.

This report, as its title "intellectual investment and economic development" implies, will deal more especially with economic aspects. At the same time, it is not our intention to ignore the twofold role of education or, consequently, the relative scope of our conclusions. In the present chapter, by way of an introduction to a study of the specific characteristics of intellectual investment in agriculture, we in turn deal with *(I)* the fundamental characteristics of intellectual investment in general, *(II)* its evolution in relation to economic growth and *(III)* "disparities" that may arise between different sectors and zones of the economy[2].

Section I. FUNDAMENTAL CHARACTERISTICS OF INTELLECTUAL INVESTMENT

6. The process of technical progress may be summarily described as follows. An invention, made in a laboratory and then perfected, is brought into practical use by an "innovator" (Schumpeter), it is then propagated more or less rapidly. The successive stages of progress are directly influenced by levels of education and rates of school attendance : educational development. A country's efforts to increase its intellectual capital (or intellectual investment : IN), to promote technical and social progress, can be estimated in the first analysis by the total amount spent annually on research (R), education (E) and information (V).

$$IN = I + E + V \qquad \text{(III)}$$

These investments are the result of action (coordinated or otherwise) by the State, public organisations, various groups, firms, etc. They are thus financed from public, private or mixed sources. To estimate the quantity of intellectual investment it is necessary to first define the content. For instance, should it include all or only some of the total works published ? To what extent should publicity be taken into account, etc. ?

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[1] Friedrich Edding : Internationale Zeitschrift für Erziehung, No. 2, 1960.

[2] In the present Chapter, intellectual investments are essentially the object of macro-economic analyses (global, of sectors, of regions). A more detailed analysis would lead to a distinction between the micro-economic level (individual and enterprise) and the macro-economic level. These different aspects are foreseen by A. Page, "L'investissement intellectuel", Tiers-Monde, janvier-juin 1962, pages 27 to 113.

When we come to consider education, a distinction must be made between financial cost and real cost. The latter includes the income foregone, which the extension of school-leaving age entails for students and their families[1]. It has been estimated that the income foregone represents three-fifths of the total cost of higher education in the United States[1]. Education may be financed through the national budget and that of local authorities, by bequests (foundations, etc.), by school fees, by fiscal exemptions. Investments proper may be facilitated by borrowing.

The difficulties in estimating the extent of intellectual investment are greater for the private than for the public sector. These difficulties are not, however, insuperable. They can be tackled singly and agreements be made to render the statistics comparable on the international level.

7. Formula (II), $I = C + E + IN$, suggests overall consideration of the importance of education in relation to material investment, consumption, and national income. But available statistics are, in most cases, fragmentary, dispersed and not comparable from one country to another. The first recommendation we are led to make is that the funds allocated to research and statistics on intellectual investment be increased. These statistics are no less important, and no more difficult to compile, than those relating to the active population, power, transport, foreign trade, etc., which have been the subject of many discussions on the international level and are compiled and published regularly.

If the statistics relating to intellectual investment are both infrequent and inaccurate, the reason is not of a technical nature. The scarcity of such statistics is indicative rather of the past lack of interest on the part of statisticians and economists in this field of investment.

8. Of all forms of intellectual investment, education is the one for which we possess the most satisfactory data. Professor F. **Edding** has published a report giving all available statistics and estimates of the proportion of national income devoted to education[2]. According to a UNESCO publication, expenditure on education by the State and other public bodies in about 1950 varied from 1 - 5 per cent of the total income of each country[3]. Tables prepared by Professor I. **Svennilson** and his colleagues show that in about 1958, global

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[1] Some Economic Aspects of Educational Development in Europe, page 35, page 59 et. seq. (International Association of Universities).

[2] Friedrich **Edding** : Internationale Tendenzen in der Entwicklung der Angaben für Schulen und Hochschulen.

[3] UNESCO : Public Expenditure Relating to Education. Paris. 1955, 193 pages (document ST/R/14).

expenditure on education represented 4 per cent of the gross national product. The United States had the highest rate — 4.53 per cent. The rate for Western Europe averaged 3 per cent, but the Mediterranean countries (other than Italy) devoted less than 2 per cent of their national income to education[1].

Statistics relating to total expenditure on scientific research are unreliable and dispersed. In Germany such expenditure is reported to be about 1 per cent of the national income, whilst in the United States it is said to be nearly 3 per cent[2].

A preliminary examination suggests that, insofar as Europe is concerned, material investment represents about 20 per cent, and intellectual investment about 3 - 5 per cent, of the national income.

9. Apart from these data which enable us to measure the interest of countries in intellectual investment, we might also inquire into the importance attached by public opinion to this type of investment, into the role assigned to it in the principles governing national policy, and into the number of pages devoted to it in national or regional plans for economic and social development. In a great number of development plans, intellectual investment is in most cases dismissed in a few pages and is rarely the subject of genuine planning based on a forecast of needs[3]. The first French modernisation and equipment plan, which established a priority list of essential investment, completely ignored the problems of training. Obviously this was not regarded as a form of investment. (But in 1951 a "Planning Commission for the Equipment of Schools and Universities" was constituted and in this way plans for intellectual investment were integrated into the overall equipment and modernisation plan.) To take another example, it seems that plans for intellectual investment should have been studied more thoroughly in the "Mediterranean Development Project"[4].

10. Intellectual investment may be the subject of methodical analysis on the lines of those practised for material investment. Their basic characteristics may be defined, their amount and orientation (proportion allotted to different categories) may be determined, their cost may be estimated, the different methods of financing may be evaluated, their efficacy determined, priorities established, etc. For the moment we shall confine ourselves to stating a few fundamental propositions, some of which will be dealt with later in more detail.

a) Intellectual investment is at one and the same time "productive investment" (an increase in the productivity of human labour) and "investment in well-being" (development of man). This two-fold character must not be lost sight of.

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[1] I. SVENNILSON : Op. cit., page 93.

[2] Théorie Economique et Recherche Scientifique. Eco. Apl. No. 2-3, pages 284 et 285.

[3] This will be dealt with in detail in Chapter VII.

[4] F.A.O. Mediterranean Development Project, Rome 1959.

b) Many difficulties are encountered in evaluating the efficacy of intellectual investment. The methods in use at present are not completely satisfactory, but "the returns in education, both individually and socially, seem to be at least as high as those in physical capital. More important, the development of the physical equipment of society may largely be wasted unless there is the trained talent to work it"[1]. Having regard to the nature of intellectual investment, its efficacy cannot be measured exclusively in terms of "rentability". It is investment in "humanism", and we must also consider the role it plays in integrating the different social categories of which the nation is composed and in the functioning of an enlightened democracy.

c) Intellectual investment implies the existence of a body of costly means. Education is tending to become the most important sector of activity in the national economy and is the largest consumer of highly qualified manpower. The resources devoted to research, training and information should therefore be fully employed in an efficient manner. While productivity is not the best measure by which to judge education, "it would be strange if in a world of rapid technological change it were not possible to achieve a more effective and economical education system"[2]. More research than hitherto must be effected into the patterns and methods of research, education and advisory work.

d) Intellectual investment is financed from public, private or mixed sources. Insofar as public financing strongly predominates (this is most frequently the case), the development of such investment depends on the volume of taxation and on the criteria by which priorities are established by public authorities. It is obviously impossible to develop education while maintaining taxation at a constant level or reducing it, if other budget items remain constant. In a democratic economy the criteria by which budget priorities are determined depends, *inter alia,* on the pressure of public opinion and, therefore, on the latter's attitude to education. Intellectual investment should be more of a subject of information than it has been in the past.

e) The delay in achieving results is generally long (duration of training, uncertainty and length of research in relation to the improvement of production processes, etc.). Hence the necessity for long-term programmes (or plans) based on suitable forecasts and calculations; the importance of accelerated training methods in countries which, because of their relative backwardness, are obliged to spend particularly large sums; and the role of technical co-operation.

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[1] Some Economic Aspects of Educational Development in Europe, Op. cit., page 5.

[2] Some Economic Aspects of Educational Development in Europe, Op. cit., page 7.

Section II. RELATIONSHIP BETWEEN INTELLECTUAL INVESTMENT AND ECONOMIC AND SOCIAL DEVELOPMENT

11. Mr. John VAIZEY writes that "education may be a necessary condition for economic growth, but it is not a sufficient one"[1]. History shows that systems of education dominated by tradition have hindered a positive attitude towards economic development. In "backward" countries, those reputed to be the most cultivated have not always been the strongest supporters of the changes necessitated by economic and social development. But the economic role of education and vocational training has become clearer as technical progress has appeared as "the great hope"[2], capable of procuring a more rapid rise in the standard of living in Europe, and of helping to solve certain problems in the under-developed countries. Mr. SVENNILSON writes that "the marked emphasis on education in the production effort of the Soviet Union has certainly contributed to a re-appraisal by the Western countries of the role of education in their social and economic development"[3].

Owing to the lack of statistical data and studies relating to intellectual investment as a whole, it is impossible to establish clearly the relationship between such investment and economic growth. The supply of data and studies in regard to education is better, and it seems that the basic relationship between economic growth and education can be formulated in four propositions.

12. FIRST PROPOSITION

"As society grows richer the proportion of its income it spends on education rises"[4].

UNESCO experts have shown that the decline in illiteracy throughout the world is related to the increase of income per head (economic growth)[5] and, having regard to the relation between growth and economic development (generally manifested by the decline of agriculture) they have shown that the proportion of illiterates becomes lower as the proportion of those engaged in agriculture becomes smaller and that, consequently, industrialisation is generally accompanied by a decline in illiteracy (although education might either follow or precede industrialisation). [See graphs and remarks at Annex I.]

Studies effected by Professor F. EDDING show that in the majority of countries expenditure on education increases more rapidly than the gross national product[1]. Expenditure on education in the United Kingdom "rose from 1 per cent of the gross national product in 1900 to over 2 per cent in 1920, to nearly 3 per cent in 1938 and to 4 per cent in 1958". The same rise can be noted in all countries for which figures are available"[2]. Mr. J. Vaizey finds a close relationship between the level of national income and the proportion thereof devoted to education ; this proportion varies from 1 to 2 per cent in the poorer countries, and from 4 to 5 per cent in the richer ones.

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[1] John VAIZEY : The Economics of Education.

[2] J. FOURASTIÉ : Le grand espoir du XX^e^ siècle. P.U.F.

[3] I. SVENNILSON : Op. cit., page 16.

[4] Some Economic Aspects of Educational Development in Europe. Op cit., page 10.

[5] UNESCO : World Illiteracy in the mid-nineteenth century.

Thus, as soon as a society becomes more affluent, it spends more in absolute terms on education but, what is more important, the marginal propensity towards intellectual expenditure increases[3].

13. Professor Svennilson writes : "As personal incomes rise young people and their parents want and can afford more education ; and as national incomes and Government revenues rise, increasing resources can more easily be allotted to education"[4].

This proposition means that an increase in the proportion of income devoted to education results from the twofold action of families and public authorities. Nevertheless, insofar as access to education tends to be regarded as a fundamental human right, and therefore insofar as education is concerned tends to become free, the development of expenditure on education depends on the extent of the funds assigned to education by public authorities. The proportion of resources devoted by the State to education is increasing. In France, for example, this trend has become strongly marked in recent years. The relative amount of money allocated to public education compared with the total State budget has increased as follows : 1950 : 7 per cent ; 1958 : 10 per cent ; 1962 : 15 per cent. By 1970, State teachers will represent over half of the total number of civil servants, and education will be the largest sector of national activity, absorbing 25 per cent of the total population[5].

The existence of a high correlation between the rate of increase in intellectual investment and the rate of economic growth does not, however, imply a cause-effect relationship. Rather a relationship of reciprocal action exists. Economic growth makes educational development possible by freeing the necessary resources, and education plays a role in economic development.

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[1] Friedrich Edding : Internationale Tendenzen — op. cit.

[2] International Association of Universities. Op. cit., page 9.

[3] Working from formula II, page 14, the marginal propensity towards intellectual expenditure can be calculated :

$$\mathrm{mp} = \frac{\Delta I}{\Delta I} = \frac{\Delta C}{\Delta I} = \frac{\Delta E}{\Delta I} + \frac{\Delta IN}{\Delta I} = 1$$

[4] Op. cit., page 15.

[5] Louis Cros : L'explosion Scolaire, Paris. In 1958, public expenditure on education, as a percentage of current government receipts, amounted to about 10 per cent in Europe, 15 per cent in the United States and Canada. (I. Svennilson, op. cit., page 81).

14. SECOND PROPOSITION

The system of education is affected by economic growth and development.

a) By economic growth, which is reflected in an increase of income per head of population, and makes possible a :

— reduction of working hours ;
— raising of school-leaving age[1] ;
— democratisation of education.

There is a connection between economic growth and the development of education. In the present state of economic progress it is possible and desirable to introduce educational reforms similar in extent to those effected at the end of the 19th century by the generalisation of primary education[2]. Under the traditional system of education the *élite* is recruited from amongst a privileged minority. The democratic system recruits the *élite* from amongst the population as a whole and, by abolishing the numerous barriers that restrict access to education (family and group influences, lack of information, cost of studies, division of different types of education into separate compartments, malthusianism, etc.), becomes a powerful instrument of transformation and social progress.

b) Through the development reflected by continual change of activity[3] and by the continual creation of new specialisations, fewer young people take up the trade practised by their parents and "of children now entering school, a quarter at least will work in a kind of job that does not yet exist"[4].

Social mobility implies intellectual mobility and the plasticity of systems of education. Economists, educational experts and sociologists all favour a "pyramidal" system of education, grouping children of varying aptitudes together in order to provide them with a common education of a general character, rather than a "compartmental" system alleged to be based on intelligence categories, but in fact often based on a premature selection in which social environment frequently plays a decisive role.

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[1] J. FOURASTIE writes : "Apercevoir clairement le lien qui lie la durée du travail des adultes à la durée de la scolarité de la jeunesse par l'intermédiaire du niveau de vie est l'un des 'pont aux ânes' de la Science Economique" — Pourquoi nous travailons — P.U.F., page 92 (to see clearly the link, through the standard of living, which connects the working hours of adults and the school-leaving age of young people is one of the elementary principles of economic science. Why we work.)

[2] The graph of school attendance in France shows an "accelerated movement" from 1880 to 1900 for primary school attendance, and a similar movement has taken place for secondary school attendance since 1945. In 1880, 1.7 per cent of children attended school until the age of 16, 35 per cent in 1960, and in 1970 it will be 100 per cent. (Compulsory school attendance until the age of 16.)

[3] A basic trend related to economic growth may be described as follows : In Western-type economies during the 19th and 20th centuries production increased more rapidly than population, and the average income per head of population increased (economic growth). This growth has been accompanied by a change in the pattern of consumption, and therefore in the relative size of the various sectors and branches of production (economic development).

[4] Some Economic Aspects of Educational Development in Europe, op. cit., page 22.

With the increasing rate of progress and greater social mobility, general education becomes more essential than ever before. Moreover, it is the "common language" of all the socio-professional classes composing a nation. It is more important to "learn how to learn" than to acquire a mass of facts which rapidly become obsolete.

There is no contradiction between the development of general education and the training of the ever-increasing number of specialists which economic development entails. The educational system should train the various types of specialists at the most mature age possible and on as extensive a general education as possible and, by means of further education after the compulsory school attendance period, should, in conjunction with an information system, ensure permanent professional training and information.

15. THIRD PROPOSITION

Intellectual investment affects economic growth and development.

We are convinced that a society's progress depends on the process of invention, diffusion and use of new techniques, and that this process is directly influenced by the level and general diffusion of knowledge. It is, however, difficult to estimate the economic role of intellectual investment. For this purpose use can be made of micro- and macro-economic methods; or the rate of rentability or overall productivity can be calculated. But none of the methods being used at present is fully satisfactory[1]. Calculations made by G. S. BECKER in the United States show that the rate of interest from intellectual investment (11 to 13 per cent, according to the method of calculation) is much higher than the yield from transferable securities and real estate. According to calculations made by Professor SCHULTZ, total income in the United States increased from 1919 to 1957 at an annual rate of 3.1 per cent, whereas tangible assets increased at the rate of 1.8 per cent. The combined rate of increase in working hours and tangible assets has fallen to 32 per cent of the rate of income increase[2]. This method (residual) must be treated with a certain reserve, but it nevertheless leads to the conclusion that "accumulation of knowledge" plays a decisive role in economic growth. These calculations, however, must not lead us to lose sight of the fact that it would be very dangerous to consider only the economic aspect of education. We have already emphasised this.

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[1] John VAIZEY : The Economics of Education.

[2] "The Social Service Review", Volume XXXIII, No. 2, June 1959.

16. FOURTH PROPOSITION

For the same level of income, the average and marginal propensity towards intellectual investment vary from one country to another.

The first proposition admits a certain relationship between the amount of income and the expenditure on education, but outside this trend there is a more or less strong dispersion expressing national habits, the value attributed by families to education, the part played by political decisions, and the social-economic aspirations of the people. Studies undertaken by Professor **SVENNILSON** and his colleagues reveal that in about 1958 the school attendance rate for the 15 to 19 age group was higher in the U.S.S.R. than in European countries having a corresponding gross national product per head of population.

Finally, what counts is not the strength of the socio-economic system of a nation or a sector at a given moment, but the dynamism of this strength. To ascertain the relative strength of different countries account must also be taken of the educational facilities, the average length of school attendance, the training and information facilities provided at all ages, the efforts made to use "a nation's most precious capital" and to recruit and train minds, etc.

It is probable that future differences in economic growth and development will result far more from present disparities in rates of intellectual investment than from those in material investment.

17. The need to stimulate economic and social growth, especially in developing countries; the increase in the number of pupils, as a result of an increased birthrate and longer compulsory schooling (democratisation of education); and the need to maintain and improve the quality of education simultaneously with the quantitative increase (a basic aspect of educational development), make a forward-looking attitude to educational problems more and more necessary, and the planning of intellectual investment in relation to overall economic and social development essential.

Reference should be made in this perspective to the importance of the "Mediterranean Regional Project" of the O.E.C.D. Directorate for Scientific Affairs. The Mediterranean Regional Project provides a good example of a new type of technical assistance. Undertaken bilaterally with six countries, it constitutes a serious attempt by Southern Europe (Greece, Italy, Portugal, Spain, Turkey and Yugoslavia) to define educational needs, and to establish plans to enable the educational system to train those required to meet the needs for the next fifteen years.

Section III. DISPARITIES IN INTELLECTUAL INVESTMENT

18. The amount devoted to education (and probably to other forms of intellectual investment) depend on the extent of the national income (correlation of income and intellectual expenditure) and,

for an equal income, on the importance attached to education by the community and the public authorities. The disparities in incomes and resulting efforts give rise to a serious disparity in the volume of intellectual investment between countries. But within a single country disparities can be observed in relation to social categories, production sectors and branches of activity.

19. The social class phenomenon is one of the principal causes of inequality in education in all modern western societies[1]. In countries such as France and Great Britain, notwithstanding the efforts made in recent years, full democratisation of education has not yet been achieved. Sons of farmers and farm workers represented 5.7 per cent of students attending French universities in 1959, whereas this social-professional category represents 26.8 per cent of the total active population.

Social class therefore restricts access to education. At first the disparities appeared to be related to the scale of incomes, and an attempt was made to reduce such disparities by providing free education. But a more profound analysis has revealed the complex role played by social class regarding access to education and to educational success ; as well as the inadequacy of free education as a means of ensuring a real democratisation of education.

20. Calculation of the coefficients of school attendance at a given level is a means of revealing regional inequalities. Studies of this type carried out in France show that the "rural factor is the most important factor and the one which seems most decisive in determining whether children attain their education"[2]. These facts recommend decentralisation and pupil collecting in the broader perspective of a policy of regional improvement.

21. An estimate and comparison of sums spent per sector and branch of activity on research, training and vocational information would be useful and might help explain certain existing conditions. On the basis of the statistics available, it can be said that the average period of training for those engaged in farming is in most cases shorter than that of other social and professional categories. Available statistics for Canada, England, France, the United States and Japan show that in agriculture the percentage of the manpower which has undergone a specified length of studies is always less[3]. This state of affairs is due neither to technical nor to economic reasons, but rather to psycho-sociological considerations[4].

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[1] Jean Floud : Social Class Factors in Educational Achievement, in "Ability and Educational Opportunity", O.E.C.D., page 93.

[2] Jean Ferrez : Regional Inequalities in Educational Opportunity. In "Ability and Educational Opportunity". O.E.C.D., page 74.

[3] H. S. Parnes : Relation of Occupation to Educational Qualification. O.E.C.D., 1962. Training Course for Human Resource Strategists.

[4] A. J. Wickers : Aperçu sur l'évolution de la petite exploitation aux Pays-Bas. Bulletin de l'Institut Agronomique et des Statistiques de Recherche de Gembloux, Belgium. Série du Centenaire — Vol. I, page 519.

In some countries in the past there has been a constant disparity between the sums allocated to non-agricultural vocational training and those devoted to agricultural training. In France, although the active agricultural population constitutes 25 to 30 per cent of the total active population, eight times as much money was allocated to technical than to agricultural training in 1939, thirteen times as much in 1948, and eleven times as much in 1958.

It appears, from this attempt to survey certain phenomena of the disparity in education (similar studies are desirable in regard to information and research with a view to discerning the phenomena of disparity peculiar to them) that the factors of disparity, namely, income levels, social environment, locality, and amounts spent by public authorities, may sometimes have a cumulatively adverse effect on the extent of intellectual investment in agriculture.

"A direct economic approach defines additional intellectual investment in agriculture on the basis of a comparison of the returns expected in the different sectors"[1]. But a number of non-economic factors in fact intervene in the distribution of intellectual investment, and the actual level of instruction of the various social-professional categories depends in most cases more on a group of historical factors than on a rational determination of the level of instruction required of different categories of workers. We recall that education/investment is only one aspect of education, and that rural education should be envisaged as an instrument for the economic, social and cultural development of the rural population. The needs for efficacy and equity justify a reduction of these educational disparities.

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[1] Recommendations of the Seminar, Annex II.

Chapter I

INTELLECTUAL INVESTMENT IN AGRICULTURE

22. The remarks made on intellectual investment in agriculture are guided by research into intellectual investment in general (and more especially into the economics of education), and of which an attempt was made to give a synthesis in the introductory chapter. For the agricultural sector, however, it is not possible to produce such elaborate studies as those available, for instance, concerning the economics of education in general. The main difficulty is the inadequacy of statistical data and, as far as available data is concerned, the fact that it is unreliable and dispersed.

If O.E.C.D. Member countries regard intellectual investment in agriculture as a fundamental factor in social and economic development, and therefore a factor in the disparities found in regional development, they should resolve that statistics of such investment will be established and regularly published, in order to follow its development and, if necessary, to promote it by methods adapted to the respective situations of Member countries.

Recommendations might be made for the preparation of such statistics, and an *ad hoc* committee be established to ensure the standardisation of their composition and presentation. It is highly desirable that they be regularly collected and published in the Bulletin of "Agriculture and Food Statistics" (O.E.C.D. Statistical Bulletins). This bulletin includes data on surface areas, agricultural employment, means of production, output, prices, foreign trade, food availability. By adding statistics concerning intellectual investment in agriculture, analyses could be made which are not at present feasible, or are feasible only if a considerable amount of time is spent in searching for data, or if specific inquiries are made.

In this chapter an attempt is made to make the best possible use of available statistics and of those obtained from the inquiry undertaken. It must, however, be stressed that the data in this report constitute no more than levels of investment. We shall consider in turn : *(I)* the basic characteristics of intellectual investment in agriculture and *(II)* its relationship to economic and social development.

Section I. BASIC CHARACTERISTICS OF INTELLECTUAL INVESTMENT IN AGRICULTURE

23. Like all sectors of national activity, agriculture benefits from scientific progress (basic research), from the basic education given to all social and professional categories, from the general information systems (press, radio, television), from cultural centres open to all, etc. The development of research, education and information within a nation benefits all sectors of activity and influences progress in each. Those engaged in farming, like all other social and professional categories, are affected, in the first place, by the organisation and development of overall intellectual investment. But each sector of national activity has specific needs in matters of research, training and vocational information, and these needs are satisfied by "sector intellectual investment".

24. An exact estimation of the relative size of such investment cannot be made from available statistics. It is probable that great disparities exist in the needs, means and special characteristics of each sector. Opinion differs on the portion of these needs which should be met from the overall system of intellectual investment and from the specific systems. The solutions differ from one country to another, according to tradition and respective level of economic and social development. For instance, should the training of those engaged in farming be a form of education apart? Should they continue to benefit from the overall educational system for as long as possible, or should they receive special training at an early stage? Should an important place be assigned to general education or should the education of those engaged in farming proceed from a more practical concept? It would appear that economic and social development requires that the system of intellectual investment in agriculture be increasingly integrated in the global system. This evolution, moreover, appears to more and more correspond to the social aspirations of those engaged in farming. In fact, the border-lines between global intellectual investment and sector investment fluctuate and vary from one country to another, and this further complicates an attempt at international comparisons.

25. Intellectual investment "specific" to the agricultural sector means the expenditure devoted annually to agronomic research (aR), to instruction provided in agricultural schools and in schools and faculties of agriculture (aE), and to agricultural advisory services (aA). To these must be added a series of means relating to "combined operations" or to specific aims (rural youth movements, co-operative groups, various forms of cultural activity, etc.), which are referred to as other forms of intellectual investment (Of).

The sum of this expenditure may, therefore, be represented as follows:

$$aI = aR + aE + aA + Of \qquad (IV)$$

The final agricultural product (aP) of any economic ensemble is a fuction (F) of the cultivated areas (C), of the number of agricultural assets, or more precisely, of the number of effective labour units (L), and of material and intellectual investment (Mi and Ii, respectively).

$$aP = F\,(C, L, Mi, Ii) \qquad (V)^{1}$$

Formulae (IV) and (V) suggest a certain amount of statistical research and economic studies concerning the volume and pattern of intellectual investment in agriculture (IV) ; its relative size, compared with the value of the final agricultural product, with other forms of investment, with expenditure in the form of wages and land rent ; the part played by intellectual investment in the evolution of agricultural production, etc. ; but we lack the necessary statistics and the studies suggested have hardly begun.

26. The most complete available statistics come from the first inquiry into public investment carried out by O.E.E.C.[2]. This survey dealt with the year 1955 or 1955-56. A serious attempt has since been made in some countries to develop certain forms of intellectual investment, or all forms of such investment. Our own inquiry produced only fragmentary and unreliable results. The E.E.C. has collected a certain amount of data for its six Member countries[3] and has conducted a much more extensive inquiry into the patterns of agronomic research during 1960. The E.E.C. questionnaire and (so far as research was concerned) that the O.E.C.D. were harmonised[4].

An analysis of available documents reveals differences which are sometimes considerable in absolute terms, but the relative positions of the countries in question remain almost constant. Therefore, when classifying and describing the systems of intellectual investment practised in Member countries, account should be taken of the scales of expenditure rather than of the absolute values.

27. A few basic features are summarised below :

a) Since a policy entails in the first place a budget, the composition of government expenditure provides an initial indication of the importance attached by Member countries to intellectual investment (see Annex I, Table I).

Belgium, Denmark, Germany, the Netherlands and Sweden devote a substantial portion of their government spending to intellectual investment. France, Greece, Italy and other countries only

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[1] Discussion of the global function of production is outside the scope of this paper.

[2] O.E.E.C. : A first inquiry into public investments.

[3] B. Oury : L'agriculture au seuil du marché commun — les investissements intellectuels, pages 238 et seq. (Agriculture on the threshold of the Common Market — Intellectual investment, page 238 et seq.), (P.V.F., Paris 1959).

[4] E.E.C. : Principales conditions de production de l'agriculture des pays membres, Brussels, 1959.

devote about 5 per cent of their State expenditure to this category of investment.

b) Public expenditure expressed as a percentage of gross agricultural product, per head of active agricultural population, per farm unit, or per hectare, are more significant than total expenditure. Table II of Annex I reveals that:

- *i*) Public expenditure represents (on simple average) 1.1 per cent of the gross agricultural product. In France, Greece, Italy and Turkey it represents 0.5 per cent or less (in Denmark also, but here "private" financing of such investment is probably very considerable). Belgium, Iceland, the Netherlands, Norway, Sweden and the United Kingdom spend more, or much more, than the average.
- *ii*) Expenditure per hectare and per farm leads to similar conclusions. The Netherlands, which spends the most per hectare, spends three times the European average.
- *iii*) Similar conclusions can be drawn from Table IIb. A comparison of Tables IIa (1955-56) and IIb (1959-60) reveals an upward trend in expenditure, but the basis of evaluation is not exactly similar.
- *iv*) The disparities to be found in the Member countries of the European Economic Community justify our underlining the fact that intellectual investment per head of active agricultural population is greatest in the highly industrialised countries of Northern Europe (Table IV).

c) The orientation of publicly financed intellectual investment can be shown by the relative distribution of expenditure amongst the three basic categories, agronomic research, agricultural education, agricultural advisory services.

It may be assumed that this pattern is related to economic development. The highly developed countries devote substantial sums to research. For countries in the process of development it is probably an advantage to allocate relatively more funds to education and information. Nevertheless, the pattern of publicly financed intellectual investment is directly infuenced by the participation of private resources and by State action in promoting the various investment sectors.

As can be seen from Table V, the allocation of funds for research predominates in the investment systems adopted in Canada, the United Kingdom and the United States, while in Mediterranean countries the available funds are mainly applied to the development of education and advice. The policies adopted in other countries lie between these two extremes[1].

d) We have hitherto only examined public expenditure. To this must be added expenditure from private sources. To form a real appreciation of the work accomplished in the various countries to promote and propagate knowledge, the total amount of public and private funds devoted to intellectual investment should be taken into account. Unfortunately, at the present time such statistics are seldom available. We have only succeeded in procuring them for four countries (the Netherlands, Portugal, Spain and Sweden), where expenditure from private sources amounts, respectively, to 9 per cent, 6 per cent, 5 per cent and 3.15 per cent of total expenditure.

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[1] Table III shows certain changes in allocation which have occurred in some countries.

28. Available statistics reveal that in most cases European Member countries of the O.E.C.D. can be classified into two broad zones — the Mediterranean countries and the remainder. The industrialised countries of Northern Europe occupy a privileged position insofar as the promotion of agronomic research, education and advice are concerned. The main fact which emerges from these statistics can be stated as follows. It is not in those countries where the agricultural sector, relatively speaking, is the most important that public authorities spend relatively most on intellectual investment in that sector (the percentage value of the final agricultural product represented by this investment) ; it is in the most highly industrialised countries that they do so. Industrialisation and the raising of income associated with it facilitate the development of intellectual investment in agriculture.

29. *e*) A number of studies have been made in order to determine the efficacity of intellectual investment at the farm and local community level.

Research at the level of the farm is generally based on inquiries, and is limited to determining a relationship between the level of training of those engaged in farming and certain economic coefficients which characterize good management. Reference may be made, in particular, to the inquiry carried out by the Norwegian Institute of Farm Economics[1], and to a Danish inquiry, the results of which are shown in Annex I, Table VI.

Global research is based on the international comparisons method and aims to establish a correlation between productivity in agriculture and the extent of intellectual investment. The following table was prepared for the E.E.C. countries :

	ITALY	FRANCE	GERMANY	BELGIUM	NETHER-LANDS
Plant calories per day and per farmer (1,000)	40	92	71	142	156
Intellectual investment per farmer (in U.S. dollars)	0.86	1.71	8.16	29.4	25.4

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[1] Norwegian Institute of Farm Economics, Oslo, 1957 (quoted by B. OURY, page 248 et seq.).

Although these methods may reveal trends they are, nevertheless, very inadequate. An estimation of the productivity of intellectual investment requires an analysis of all factors influencing production, if a correct attribution of its effects is to be made. In any case, any reasoning in terms of productivity is inadequate when dealing with intellectual investment. Results must also be analysed in terms of human and social development.

Section II. INTELLECTUAL INVESTMENT AND THE ECONOMIC AND SOCIAL DEVELOPMENT OF AGRICULTURE

30. Considering the total function of agricultural production :

$$Ap = F\ (C, L, MC, IC)^1$$

If we examine the evolution of the parameters governing the volume of production during a given period (from pre-war to 1953-57), we find that :

a) The agricultural area of O.E.E.C. Member countries declined from 192,489,000 hectares to 188,126,000 hectares. In other words, a reduction of about 4,000,000 hectares, almost equivalent to the agricultural area of Benelux (or of Portugal or Sweden) but higher than that of Denmark.
A decline is registered in all Member countries except Iceland, Ireland, Italy, the Netherlands and Portugal, where the area has either remained constant or increased slightly[2].

b) The number employed in agriculture diminished by 21 per cent during the same period. The rate of reduction varies from one country to another, but is recorded in all Member countries for which employment statistics are available[3].

31. Having regard to the above formula several forms of agricultural expansion can be envisaged :

- — by an extension of farming areas ;
- — by an intensification of production through increase of labour or capital or both ;
- — by an increase in the efficacy of production factors and productive combinations, by intellectual investment and proper training of workers.

It is obvious that the development of agricultural production in Europe results exclusively from material and intellectual investments :

$$\Delta\, Ap = F\ (Im, IN) \qquad \text{(VIII)}$$

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[1] C = cultivated area ; L = number of labour units ; MC = material capital ; IC = intellectual capital.

[2] Source : O.E.E.C. Agricultural and Food Statistics, Paris 1959, page 2.

[3] Source : op. cit., page 8.

It is no exaggeration to say that the development of European production is based on intellectual investment, because the development of material investment has mainly been achieved through the discovery of new production factors, such as fertilisers, pesticides, machinery, etc., or through the improvement of traditional biological means.

It is consequently strange that intellectual investment is not in itself the subject of research (to our knowledge there are no centres specialising in the study of intellectual investment patterns and methods) in any of the European Member countries, and that intellectual investment statistics are more dispersed and incomplete than those concerning the development of livestock production ! We have not yet acquired the habit of examining the principal factor in the economic and social development of agriculture.

32. The basic tendencies of agricultural development in Western economics may be summarised as follows.

a) The production of foodstuffs has increased more rapidly than the population, resulting in a greater supply of food per person.

b) The contribution of agriculture to economic well-being has diminished. "As income increases, the amount spent on food increases in absolute terms, but diminishes in relative value" (ENGELS' law). The consumer spends relatively less on food, relatively more on housing, comforts, education, leisure, etc.

c) The development of the consumption pattern, on the one hand, and the increase in the productivity of agricultural labour, on the other, results in a diminution in the active agricultural population. But this diminution has been accompanied by an increased "service" for those engaged in farming. In other words, the division of supervisory work, typical of the evolution in industry, has in agriculture taken place in an original way in relation to the artisan pattern of agriculture. The formation of farmers' groups makes it possible, *inter alia,* to avail of the services of an ever-increasing number of agricultural specialists.

d) Despite the increase in productivity and the fall in agricultural population, agricultural incomes (which have increased in absolute value) are still relatively low, resulting in a "malaise" which is all the more serious because farmers' aspirations for equality in its various forms are daily becoming stronger.

33. It may be assumed that :

a) the rate of agricultural progress will continue to accelerate;

b) production will continue to rise more rapidly than population, and in some countries surpluses will increase ; we are living in the "age of affluence" ;

c) the exodus from the land will continue ;

d) the determination of farmers to share in economic and social progress will be increasingly insistent. Probably the greatest social phenomenon of twentieth century Europe will be the accession of "peasants" to the various forms of culture and ways of life born of the industrial revolution.

This outline of the evolution of agriculture needs to be completed, qualified and discussed, but we cannot do this in the present report. We think these trends are sufficiently clear to serve as a basis for our observations on intellectual investment (more particularly in agricultural education) considered in relation to the economic and social development of agriculture. A certain number of ideas formulated in the introductory chapter, section *II*, will recur.

34. *a*) The acceleration in technical progress leads to a new attitude towards education. In the coming years, the farmers of the year 2000 will be trained. The vocational knowledge they will require will probably be very different from that required by the 1961 farmer and, moreover, we are probably unable to determine what it will comprise. Education should, therefore, be orientated towards the development of powers of observation and reasoning, rather than towards the accumulation of a supply of "recipes" which rapidly become out-of-date. Education in general subjects is becoming of more fundamental importance, and an increasingly important place must be allotted to it in agricultural education. The rapid and effective dissemination of technical progress presupposes a satisfactory information (advisory) system, supported by a basic training that enables farmers to rapidly assimilate new techniques.

35. *b*) It could be that an affluent economy might threaten intellectual investment. We might hear arguments such as : Should we develop agricultural research, education and advisory services if this is going to lead to surplus products and even to an economic crisis ? We must not lose sight of the fact that expenditure on intellectual investment has a two-fold function. To use the words of economists, it is both productive investment and consumption spending which contribute directly to man's development. Democratic societies should make knowledge and culture accessible to all social and professional categories. Efforts should be made to combat the existing disparities in access to education which exist between urban and rural communities. The development of agriculture implies not only a question of outlets (quantity) ; it also involves quality, regularity of production, organisation of markets, reduction of working hours, elimination of the tasks dictated by the natural processes of farming through new social forms of labour organisation, organised leisure, promotion of new socio-psychological groupings designed to end feelings of inferiority, participation in an organised social life, etc.

The problems of affluence will not be solved by putting a brake on progress and by restricting intellectual investment. On the contrary, we must give proof of imagination and inventiveness, especially in the economic and social fields, if we are to move from a world where value is based on scarcity, and therefore poverty, to one where available wealth at last makes possible the satisfaction of all men's major needs.

It must also be recalled that an impeding of technical progress (especially through a production quota system) leads to the crystallisation of acquired positions, which is unfair to farms and regions likely to have the greatest margin for progress (family farms, areas in process of development) and discourages the more dynamic producers. With the likelihood of increasing competition between rival socio-economic systems any deliberate slowing down of progress would, in the long run, inevitably undermine the foundations of our social structure. It should be clear that the solution to problems of possible surpluses must be sought in the conquest of new markets, in a policy of aid in the form of food, or in a readjustment of the production sectors by facilitating social mobility, but never in a restriction of intellectual investment.

36. *c*) Economic development implies social mobility and especially — in most European countries — a reduction of the agricultural population, but the accepted migration from the land must take account of human factors. Social mobility may be facilitated by a system of education providing vocational guidance and re-guidance during the period of school attendance and later. Such a system implies the permeability of the various stages and types of education, of the various training for vocational advancement and re-adaptation together, where necessary, with acceptance by society of the costs. The requirements of economic development and the changes it implies necessitate suitable systems of vocational orientation, re-orientation and re-adaptation training which will contribute to security of employment (intellectual investment in professional mobility).

The foregoing considerations require that agricultural education should not be considered "apart". It must be integrated with education as a whole and the re-adaptation schemes must serve the new and prospective needs of farmers.

37. *d*) Education should be the instrument by which those engaged in farming are integrated into the national community. It will achieve this objective if it provides everyone with a common denominator ; i.e. a common culture, and if it is democratically concerned to enable everyone to attain a standard of education compatible with their aptitudes, capacities and desires. Democratisation of education is far from achieved in Europe. The proportion of sons of farmers and farm workers with access to higher education is, as we have already demonstrated, far less than the relative importance of these vocational categories in the national community.

38. Obviously, the system of intellectual investment in agriculture expands and changes in conjuction with economic and social growth and development. These changes are related both to the acceleration of technical progress and to the social aspirations of those engaged in agriculture. Their accession to education and culture, to vocational training and information is a basic feature of a parity policy. In his paper on agricultural vocational training in Europe, René CHATELAIN states that in Member countries a large number of those engaged in agriculture do not even receive a minimum of vocational training of first stage level. It is also probable that the rate of growth in school attendance increases less rapidly in rural areas than in the towns. In these circumstances, the disparities increase instead of diminishing. Professor SVENNILSON and his colleagues predict that the rate of "minimal" school attendance, around 1970, for the 15-19 year age group could be 73 per cent in North America, from 30-50 per cent in the countries of Northern Europe, 25 per cent in the Mediterranean countries and 60 per cent in the U.S.S.R. ! It would be interesting to know what the relative rate of attendance will be for rural populations.

39. The programming of intellectual investment or, more specifically, of education, is an excellent means of ascertaining the effort which must be made to prepare for the future by providing the necessary means, and to co-ordinate action. The O.E.C.D. can play a decisive role in developing the planning of intellectual investment in conjuction with overall development plans, especially in countries which, because of their relative backwardness, must make a particularly great effort. Forecasting and planning methods are dealt with in Chapter *VIII* of this report.

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40. In the following chapters we consider the fundamental trends in the principal categories of investment. Obviously, these trends are related to the traditions, degree of development, and specific needs of each country. These national differences became clearly apparent in discussions in various countries with directors of agricultural research, education and advisory services. Nevertheless, certain basic tendencies appear to exist in all Member countries. These consist solely of common trends, to some extent related to the economic and social development examined in the present chapter. The conclusions are open to discussion by readers. It is hoped the maximum information has been obtained from the many discussions, and full responsibility is accepted by the author for the propositions stated.

Chapter II

AGRONOMIC RESEARCH

41. The growth of the national product, and more specifically, of the product per worker, results from the twofold process of the accumulation of knowledge and material capital, on the one hand, and from a more efficient use of the accumulated means, on the other. It seems that the role of research, particularly of applied research linked with basic research, is to constantly invent new processes and materials (technological progress) as well as new structures (organisational progress). Research improves the utilisation of available resources, creates new ones, increases man's possibilities and the scope of his choice. An interesting product of research is the research workers themselves, insofar as research work, in most cases, increases a man's objectivity and concern for the general good.

42. According to Mr. Simon KUZNETS, the basic factor of growth (measured by the increase in the product per head of population) is "the accumulation of controlled knowledge".

Invention, which in the first place resulted from problems arising in practice, tended during the nineteenth century to precede, and often to create, "needs", and research bodies have to an increasing extent played a motive role in economic development. Statistics of patents granted provide a means of estimating the rate of accumulation of knowledge. The stages of economic growth[1] may be envisaged in relation to the accumulation and diffusion of knowledge. During the period of "conditions preliminary to starting" there should appear a "receptivity to innovation and change". From the starting-point to maturity and to mass consumption the "system of controlled knowledge" can be regarded as being constructed in depth and gradually extending to all sectors of activity. In the economy of today, research is regarded as a basic industry whose raw material is information and whose finished product is innovation. This basic industry plays a motive role in economic development and consequently tends to occupy a strategic place in countries' policies[2]. A country's prestige, and possibilities of strength and well-being, depends increasingly on the size and equipment of its laboratories, and on the number and quality of its research workers.

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[1] W. W. ROSTOW : Les étapes de la croissance (Stages in growth). Ed. du Seuil.

[2] F. RUSSO and R. ERBES : La recherche développement, I.S.E.A., Paris, 1969.

43. In the present chapter it is not proposed, however desirable it may be, to study the stages of economic research, or its role in the economic and social development of agriculture. The above generalisations suggest the following remarks:

a) Agronomic science considers the physical, biological and human sciences in their relation to agriculture. Bodies specialising in agronomic research are created to extend the system of controlled knowledge to the agricultural sector.

Agronomic research aims to give man greater power over his milieu and over the living being as an instrument of agricultural production (technological progress). The, relatively recent, creation of centres for the study of agricultural economies and sociology has introduced organisation and management to the agricultural sector.

b) Agricultural progress is the source of all progress. It is a known fact that an increase in the productivity of agricultural labour released the agricultural workers needed for other sectors of activity and for the overall development of the economy.

In the advanced countries it seems that, in the perspective of an economy of affluence, agricultural progress should contribute more and more to liberating those engaged in farming from the servitude of their natural and biological milieu and, by the proper organisation of production, make their social and cultural development possible.

44. If we again look at the formula for the agricultural system of intellectual investment:

$$IN = R + E + A + Of$$

it is clear that under an investment system providing for rapid technical improvements, with good relations between research and other forms of intellectual investment, a good administrative organisation of advisory services and the use of efficient methods, short-term agricultural progress depends directly on the increase of our knowledge. Research is the motive power for the development of the agricultural progress depends directly on an increase of our know- of intellectual investment.

Nevertheless, material available concerning this branch of intellectual investment is more scarce and dispersed than that relating to education or advisory work[1]. No extensive enquiries have been made by O.E.C.D. into the structure and orientation of agronomic research in Europe, and it does not (as is periodically done for agricultural education and advisory work) convene meetings of directors of agronomic research to enable a comparison of experiments and assessment of basic trends to be made. Our questionnaire on intellectual investment included no questions on the number of research workers. During 1960 the European Economic Community made an extensive study of the organisation and development of agronomic research in its own Member countries. In this chapter we deal briefly with *(I)* the organisation and *(II)* the orientation of agronomic research in Europe.

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[1] The chief documents consulted were:

a) The orientation of applied research in Europe, the U.S.A. and Canada. O.E.E.C. 1st ed. 1954.

b) The organisation of agricultural research in Europe. F.A.O., Rome. March, 1954.

c) The lines of evolution of agricultural research in Germany. A.I.D., 1958.

d) F. Russo and R. Erbes. La recherche-développement. Paris, 1959.

Section I. ORGANISATION OF AGRONOMIC RESEARCH

45. The patterns of research are extremely complex in most countries. The bodies which contribute either directly or indirectly to the progress of agronomic sciences are many and various. They can be classified as follows:

a) The universities and major scientific establishments which undertake independent, basic research. This type of research forms the basis for economic development. Progress in agriculture is due, in the first place, to progress in the physical, biological and human sciences, and to the work of laboratories whose programme is not influenced by agronomic considerations.

b) The agricultural faculties or schools of agriculture, which deal with the physical, biological and human sciences in their relation to agriculture, and who carry out independent research, or research integrated into an overall, co-ordinated programme. Higher education is science in the course of formation, and the professors of the faculties of agriculture are both teachers and research workers.

c) The institutes of agronomic research, whose principal function is applied research, but which often undertake fundamental research, either from necessity or to develop the capacity of their research workers.

These institutes generally have a comprehensive programme dealing with problems of agricultural development, the execution of which is the result of coordinated action by several research units. These institutes derive from what are increasingly known as "research-development"[1].

d) Private research bodies which, at the request of public authorities, the profession or groups of firms, carry out "research under

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e) Académie d'Agriculture de France: Aspects et Etapes de la Recherche agronomique en France, 1961.

f) T. Heidhues: Agricultural research and progress in agriculture, O.E.C.D. Seminar on the Structure and Orientation of Intellectual Investment in agriculture. Paris, 1962.

[1] F. Russo and R. Erbes: La Recherche Développement. I.S.E.A. Paris, 1959.

contract". This type of body is unusual in agriculture but tends to become more frequent, especially in the economic and social sectors (study departments, consultant engineers, etc.).

e) Agricultural or semi-agricultural firms which supply the raw materials required by farms (seeds and plants, fertilisers, improvements, antiparasitic products and treatments, animal feeding-stuffs, etc.), or who manufacture and distribute agricultural products, having genuine research services or study departments. Mention may also be made of farmers' organisations formed to solve certain problems of agricultural practice, which are mid-way between research in the strict sense and farm advisory work.

In all countries the collective research bodies, *a*), *b*) and *c*), are mainly financed from public or semi-public funds. They play a decisive role in the development of the physical, biological and human sciences considered in their relation to agriculture[1].

46. In 1955-56, the European Member countries which, in proportion to their total budget, spent the most on intellectual investment were Belgium, the Netherland, Switzerland and the United Kingdom. But, relatively speaking, these countries spent less than Canada and the United States (Annex I, Table V). In 1960 public expenditure on agronomic research in the Netherlands was about 1 per cent of the gross national agricultural product. For the same year the enquiry of the E.E.C. on the structure of agronomic research in its Member countries gives the following results:

COUNTRY	RESEARCH BUDGET	
	AS PERCENTAGE OF AGRICULTURAL INCOME	AS PERCENTAGE OF BUDGET OF THE MINISTRY OF AGRICULTURE
Belgium	4.9	11.2
Germany	—	—
France	2.18	4.0
Italy	0.56	1.0
Netherlands	12.0	6.5

47. Table I lists the number or research workers by categories and gives an idea of the extent and orientation of agronomic research in the different countries. It is based on the replies furnished to the questionnaire, in which a distinction was requested between *research workers proper* and *technicians*, and in which *technical* (Branch A) and *socio-economic* (Branch B) were classified into two main categories, each of which was sub-divided according

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[1] F.A.O. The Organisation of Agricultural Research in Europe, op. cit.

to a code provided. The attention of country rapporteurs was drawn to the difference between *"research proper"* and *"services for applied research"* (e.g. laboratories which undertake analyses of soil, fodder, etc. involving the repeated use of known techniques and methods). Teaching staff of the faculties and schools of agriculture were to be included only where they devote all or most of their time to research. It appears, however, that the questionnaire has been interpreted in a variety of ways and the table shows more the *orientation of research* in Member countries than its *extent*. A serious gap in this table is the inadequacy of information relating to privately conducted research.

48. As shown in Table I, in all countries surveyed the technical branch of research is much more highly developed than the socio-economic branch. This is due to several reasons.

a) Socio-economic research is of relatively recent origin in Europe. It has mainly been organised and developed since the last war.

b) Socio-economic research or, in more modest terms, economic studies, have remained more closely linked than technical research, to professional bodies, public agricultural authorities, marketing organisations, etc. Nevertheless, there is a tendency for this type of research to be developed in the faculties or schools of agriculture while, at the same time, agricultural economics research institutes (such as the National Institutes of Agricultural Economics in Italy, the Netherlands, Norway, etc.) are being created or developed, or as in France and Germany, departments of economic or social sciences are being established at the National Institutes for Agronomic Research. There is, in fact, an increasing recognition of the need for this type of research.

49. Economic and social progress is obviously not solely a result of technological progress. Its achievement also implies a more rapid dissemination of such progress, structures capable of assimilating it, better management of available resources, an orientation of production to correspond to changing needs, establishment of manufacturing industries of a satisfactorily economic size, the creation and estimation of hypothesis, programmes or plans concerning economic growth and regional, national and international development.

At a time when socio-economic research is being established and developed in Europe, it is of particular importance that current trends and experiences be compared in order to determine principles of effective action, and to establish or strengthen the basis of international co-operation in this field.

50. Table I shows that, in all countries except Sweden, more research workers are interested in *plant* production than in *animal* production. This orientation of research does not correspond to the trend in economic development. In all European countries, except

TABLE I. THE ORIENTATION OF AGRONOMIC RESEARCH IN CERTAIN

COUNTRY		BELGIUM			GREECE			IRELAND			NETHERLANDS		
YEAR		1960			1960			1961			1958		
Categories		P_u	P_i	T	P_u	P_i	T	P_u	P_i	T	P_u	P_i	T
A I	Climatology and Soil Science	54	3	57	30	x		40	x		72	x	72
A II	Plant production	95	2	97	85			47			208		208
A III	Animal production	62	2	64	5			34			112	15	127
A IV	"Génie rural"	16	1	17	9			4			63		63
A V	Others	18	2	20	70[1]			—			59	3	62
B I	General agricultural economics		x					2			15	44	59
B II	Production economics	9		9				5					
B III	Distribution economics							3					
B IV	Rural sociology							1					
B V	Rural home economics							—			5		5
B VI	Others												
Total		254	10	264	199			136			534	62	596

1. Technology and Viticulture (18) + plant pathology (42) + misc. (10).
2. Total number of research workers of this category for home economics.
3. Zoology (51) + pisciculture (9) + application of nuclear science and techniques (15).
4. Economic and social research in the United Kingdom is mainly carried out at the Universities.

EUROPEAN COUNTRIES — NUMBER OF RESEARCH WORKERS PER CATEGORY (a)

PORTUGAL			SPAIN			SWEDEN			SWITZERLAND			UNITED KINGDOM			FRANCE		
1961			1960			1960			+			1961			1960		
P_u	P_i	T	P_u	P_i	T	P_u	P_i	T	P_u	P_i	T	P_u	P_i	T	P_u	P_i	T
33		33	109	x		44		44	31	x		125			69	37	106
127		127	244			275	62	337	113			525			210	4	214
40		40	80			343	21	364	62			390			86		86
46		46	9			21	3	24	4			60			14		14
23		23	3			3		3	—			—			75^3	17	92
8	2	10	4			13	15	28	8			—			18	13	31
13	6	19	8						—			—	4				
15	1	16	3						—			—					
6		6	2						—			—			10		10
3		3	—			11^2		11	1			—			3		3
—																	
314	9	323	462			710	101	811	219			1100			485	71	556

(a) The E.E.C. had made a very detailed enquiry, particularly concerning the private sector. It comprised a questionnaire per unit of research included in the census, and took account of the time devoted to research by teaching personnel, converting this into "units of research" on the basis of the international convention, according to which a teacher devotes, on average, two-thirds of his time to teaching and one-third to research. The following numbers of research workers per country were estimated :
Belgium 385, France 772, Germany 1,331, Italy 626, Netherlands 769.
These figures are higher than those in the above table.

Code : — Pu : public or semi-public body.
— Pi : private body.
— T : Total.
— No information available.

those in the Mediterranean area, animal products occupy a very predominant place in the gross national product and their relative importance tends to increase. This situation is due to tradition; to the fact that the development of animal husbandry is in the first place influenced by that of crop husbandry, particularly by the production of animal feeding-stuffs; and to the high cost of research concerning animal production. This branch of research in Europe is, however, likely to experience considerable development in the next few years.

Section II. TRENDS IN AGRONOMIC RESEARCH

51. Certain basic trends in agronomic research in Europe, and their relation to economic and social development, may be described as follows.

a) Agronomic research was started by the universities or schools of agriculture or by private institutes, and the funds allocated to research were at first relatively small. The need for such research gradually became more fully recognised and the State was compelled to contribute increasingly large sums to its development. In most countries it now provides the greater part; in some cases it provides nearly all[1].

Although we lack the necessary statistics to evaluate the evolution of expenditure compared with the economic evolution, it is probable that the propensity towards investment in the form of research is tending to increase in all countries.

b) Agronomic research has gradually acquired a systematic, organised form. The need for central bodies (which may take various forms) is becoming more recognised in all countries. The tasks of these bodies include determining needs, supplying general directives for the orientation of research, recording projects underway, maintaining contact with basic research bodies, universities, schools and others interested in agronomic research, facilitating the supply of information, international contacts, etc.

Agronomic research will probably increasingly take the form of "research-development", will aim to determine the problems created by the development of the agricultural economy considered in relation to overall development and, having regard to socio-economic forecasts, will propose the best solutions.

In all forms of co-ordination and orientation, one basic principle must, however, be respected. Research workers must have a certain latitude in the choice of subjects and must have complete freedom in the choice of methods and the presentation of results.

c) In nearly all European countries agronomic research is chiefly technical and is centred on plant production. But it is probable that increasing importance will in future be attached to animal production and economic research.

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[1] F.A.O., op. cit., p. 7.

d) The development of research in the economic and social sciences, notably in relation to the dissemination of modern farm management techniques, should lead to a closer co-operation between the scientific research workers belonging to technical disciplines and the production economics specialists. A Seminar was organised by E.P.A./O.E.E.C. near Bristol (England) in November 1961, and the report of the consultant, Mr. S. R. Wragg of Bristol University, together with a summary of the conclusions and recommendations of the Seminar, have recently been published[1].

e) All countries are concerned to improve liaison between the research and information services. The expansion of the agricultural economy depends on agronomic research and on the speed with which results are made known. The Agricultural and Home Economics Evaluation and Information Service (A.I.D.) in Germany is an interesting initiative in Europe. In the Netherlands the farm advisory specialists are attached to the research institutes. In France a "Service for the Application of Research to Advisory Work" (S.A.R.V.) is being organised.

f) The future tasks of agronomic research (application of nuclear research) and the expansion or renovation of certain forms of international co-operation (E.E.C., O.E.C.D.) should lead to the development of co-operation in agronomic research in Europe in the years to come.

52. The efficacy of the research services is difficult to foresee. Research is an investment of problematical profitability within an undetermined period of time[2]. The economic efficacy of agronomic research can be estimated *a posteriori* through different consequences: improvement of physical returns ; reduction of fluctuations in production ; increase, in a given situation, of choice of operations ; improvement of production conditions to enable a reduction to be made in the extent and difficulty of agricultural work ; as well as cost prices ; improvement in the quality of products, etc. Economic and social research helps to facilitate and accelerate the spread of technical improvements ; to find a better system of using available resources and to increase economic and social wellbeing.

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[1] Inter-disciplinary co-operation in technical and economic agricultural research, O.E.C.D. Food and Agriculture Documentation Series, No. 50.

[2] I. H. Siegel : The role of scientific research in stimulating economic progress. American Economic Review, Volume 50, pages 340 et seq. — 1960.

Chapter III

AGRICULTURAL EDUCATION

> ***"Men of different nations, different disciplines and different philosophies met together to consider the relation between the economy and education. They were in broad agreement on a number of subjects of great importance. Education is investment in human capital ; human capital is a nation's greatest wealth ; education should be broad and not narrow ; it must be for all and not for the few ; it must be carefully planned, and imaginatively conceived"***[1].

53. The Introductory Chapter of this report has mainly dealt with the "economics of education". It has been necessary to present an overall view of the economic characteristics of education, of the relations which exist between education and economic growth, of the disparities in education as between social categories, regions, sectors of activity and production branches. This Introductory Chapter should be considered as an introduction to a study of agricultural education. Whilst agricultural education clearly presents certain specific trends it is, however, fundamental to consider its development within the framework of the overall educational system.

In the present Chapter we examine *(I)* the present dimensions of education ; *(II)* recent and probable trends ; *(III)* cost and productivity of educational systems.

Section I. PRESENT DIMENSIONS OF EDUCATION

54. The most fundamental documentation available on the present dimensions of education is that assembled and analysed by I. Svennilson and his colleagues in the O.E.C.D. publication "Policy Conference on Economic Growth and Investment in Education : Targets for Education in Europe in 1970".

Mr. I. Svennilson deplores the "obsolescence of education statistics" (page 60), and has rightly remedied this by making personal evaluations "to trace at least an outline of the magnitudes and relationships involved". With a view to giving certain basic references, and then estimating the effort made where rural youth, etc. is concerned, we have extracted the table which follows from the work of Mr. Svennilson and his colleagues.

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[1] "Some Economic Aspects of Educational Development in Europe", page 8. International Association of Universities.

This table II contains data relating to the *propensity towards intellectual expenditure* (expenditure on education expressed as a percentage of the gross national product; public expenditure expressed as a percentage of the total Government resources); to the *quantitative* development of education (rate of school attendance) and to its *qualitative* development (number of pupils per teacher).

For more details on the significance and bearing of the information assembled and the comments these give rise to, the reader is invited to refer to the original publication (pages 67-81). I will restrict myself here to observing that the greatest educational effort is made in North America, followed by the U.S.S.R., and that in Europe school attendance is lowest in the Mediterranean countries. An interesting aspect in the development of education, which is not apparent from the table, is the improved educational level of women "there were practically no girls in higher education before 1900, whereas now they account for about a third of all students at this level." (page 75).

55. The present situation of agricultural education can be characterised by information concerning notably:

- — relative magnitude of funds devoted to agricultural education compared with other forms of intellectual investment;
- — number of pupils per stage of education;
- — number of diplomas awarded per stage of education;
- — number of teachers per stage of education;
- — percentage of those who will take up farming who receive training;
- — rate of increase in school attendance;
- — origin of pupils;
- — occupations followed by former pupils, etc.

Most of this data should be compared with corresponding data concerning general education, in order to ascertain the place occupied by agricultural education in the overall national effort to promote training for the various professional categories.

56. It is unfortunately impossible, on the basis of the statistics available at present, to prepare a descriptive and comparative table of agricultural education in the different Member countries. R. Chatelain observes that the numerous lacunae in the basic data render a general appreciation difficult[1]. The data collected are too fragmentary and cover too few countries to enable a complete analysis to be made.

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[1] R. Chatelain — Agricultural Vocational Training in Europe and North America, O.E.C.D.

Table II. SOME BASIC FEATURES OF THE DEVELOPMENT OF EDUCATION IN CERTAIN GEOGRAPHICAL AREAS — IN 1958 (or NEAREST YEAR)

AREAS		NORTHERN COUNTRIES 1.	FRANCE BENELUX	AUSTRIA GERMANY SWITZERLAND	MEDITERRANEAN COUNTRIES 2.	O.E.C.D. AREA 3.	NORTH AMERICA 4.	O.E.C.D. AREA 5.	SOVIET UNION
Duration of compulsory full-time education [6]		7 to 10	8	7 to 9	5 to 8		7 to 12		7 to 10
School attendance per age group	5 to 14 years ..	94	90	31	66	78	90	83	71
	15 to 19 years ..	21	31	17	12	18	64	33	49
	19 to 24 years[7] ..	5	4.2	4.4	3.1	3.8	11.7	6.3	8.2
Teachers per 1000 of the population aged from 5 to 24		25	22	15	13	17	29	21	26
Student/teacher ratios [8]		14	22	21	16	18	17	17	15
Expenditure on education as percentage of gross national product [9]		3.61	3.47	2.81	2.65	3.21	4.47	4.01	3.74
Total public expenditure as a percentage of Government revenue ..		11.7	9.6	8.5	12.6	10.3	15	10.3	13.2

1. Denmark, Iceland, Ireland, Norway, Sweden, United Kingdom.
2. Greece, Italy, Portugal, Spain, Turkey, Yugoslavia.
3. European Member countries of O.E.C.D.
4. Canada and the United States.
5. O.E.C.D. European Member countries plus North America.
6. In practice, in many cases this period is reduced owing to lack of means.
7. Not including "migratory students" (foreign students, citizens studying abroad).
8. For the group aged 15 to 19 only.
9. Total expenditure = current + capital expenditure.

Source : Policy Conference on Economic Growth and Investment in Education : II Targets for Education in Europe in 1970 (pp. 68-81 ; tables 2, 3, 6, 7, 9, 10. For a more precise picture of the meaning and scope of the statistics, the reader is referred to the original report.

The available statistics on agricultural education are dispersed, fragmentary and unsuitable for comparisons to be made. The variety of educational systems necessitates the establishment of an international scale of comparisons.

To be able to follow and encourage the development of agricultural education, it is essential to establish a basis for a regular comparative evaluation of typical data concerning agricultural education in all Member countries.

Nevertheless, subject to certain reserves, it is possible to ascertain some of the basic characteristics of agricultural education. This education is divided into two parts — agricultural education up to university level, and university-level agricultural education.

57. I. Agricultural Education up to University Level[1]

a) The number of students has no significance unless it is related to an index of comparison (number of farms, active agricultural population, etc.).

The extent of school attendance, or the number of young people who receive a specific training compared with the number who should be trained, is the most significant index. To calculate such an index it is necessary to ascertain the probable agricultural population, the required number of workers, and the rate of renewal of manual and skilled agricultural workers ; in addition satisfactory statistics on levels of training and attendance at agricultural schools is essential. The highest attendance rates amongst Member countries are found in Denmark, Germany and the Netherlands (given in alphabetical order) [(b) : page 87]. In 1960, 85 per cent of those who would take up farming in the Netherlands recevied 1st stage, and 35 per cent 2nd stage, vocational training (d). Studies made within the European Economic Community show that, by reference to the index of trained farmers, Member countries may be classified in the following order : the Netherlands, Germany, Belgium, Luxemburg, France, Italy. R. Chatelain states that "where it is most developed, agricultural education is at present administered on an average to nearly all its desirable candidates at the 1st stage and to half of them at the 2nd stage". But these are exceptional results and a large proportion of those engaged in farming in Member countries do not even receive a minimum of 1st stage vocational training (at this level, the attendance figures are often in the region of 10 per cent to 25 per cent). When related to Table II, these data show that the rate of attendance figures for agricultural courses is lower than in other social-professional sectors.

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[1] The material used is derived from the following inquiries, reports and seminars :

a) Training of Young Farmers and Farm Workers, E.P.A./O.E.E.C. Agriculture and Food Documentation Series No. 14, 1959.

b) Agricultural Vocational Training in Europe and North America. (Chapter IV : Results and Resources : pages 85-92), O.E.C.D., No 52.

c) E.E.C. "Principales conditions de la production agricole des pays membres". (Principal Conditions of Agricultural Production in Member Countries.)

d) Inquiry into Intellectual Investment (questionnaire B).

The indications in brackets refer to the foregoing documents and the corresponding pages therein.

b) It is of more importance to consider the rate of increase in attendance at courses than the present rate of attendance. Unfortunately relevant data is lacking. R. CHATELAIN estimates that the overall increase in students during the past ten years has varied between 10 per cent to 30 per cent according to country. Progress appears to have been particularly striking in Yugoslavia, were the number of pupils has increased in 20 years from 500 to nearly 12,000. [(b) : page 86]. But the rate of increase in the number receiving an agricultural training appears to be much slower than in other branches of vocational training [(b) : page 86].

c) The vast majority of those receiving an agricultural training are sons of those engaged in farming. But, "the higher the level of education, the lower the percentage of farmer's sons [(b) : page 88], and the percentage of sons of farm labourers is extremely low. It can be clearly seen from the studies carried out in Germany and the Netherlands that the rate of attendance at agricultural courses rises as the surface area of the farms increase. In the Netherlands the rate rises from 47 per cent to 79 per cent as the size of the farms increase from 5-10 hectares to over 50 hectares [(c) : page 48 et seq]. There is also a relationship between the age group of farmers and the training index, having regard to progress in agricultural education. In France, for example, the percentage of trained farmers under 25 years of age is 16 per cent ; it is 4.4 per cent among those from 36 to 45 years of age.

A proportion of the sons of those engaged in farming take up non-agricultural occupations, and the number of those receiving other forms of training should be taken into account. Finally, it can be concluded from the statistics available, even though they are incomplete and unreliable, that of Europe's future farming community a proportion, varying according to country, still do not receive the minimum agricultural vocational training necessary to enable them to satisfactorily practise their profession. This is due to several factors — lack of receptivity on the part of those engaged in farming resulting from their present level of development ; inadequacy of farm incomes ; predominance of small or very small farming units ; failure to adapt the formulae of agricultural training to present-day requirements ; inadequacy of the funds provided by the State ; etc.

II. STATISTICS ON HIGHER AGRICULTURAL EDUCATION

58. The statistics reproduced in Table III are taken from the E.P.A./O.E.E.C. Report on "Higher Agricultural Education" publish-

ed following the International Working Conference of Representatives of Agricultural Faculties of Universities and of Higher Institutes of a Similar Standing, which was held at O.E.E.C. Headquarters in July, 1959 (Food and Agriculture Series 1960, No. 30).

Like all statistics relating to education, they are fragmentary and difficult to compare. It seems possible, however, to deduce the following basic features from them.

a) Of the total number of students, the percentage of agricultural students is very low compared to the percentage of the total active population which is represented by active agricultural population, or when compared to the percentage of the gross national product represented by the gross agricultural product (Table III).

The agricultural sector employs relatively fewer graduates than other sectors of the economy. This is probably due more to the "artisan" pattern of this sector than to the nature and importance of the problems posed. Largely as a result of the development of agricultural research, education and advice, however, as well as the establishment of various forms of farmers' associations, there is a tendency to increase the number of graduates employed in agriculture.

b) The percentage of farmers' and farm workers' sons in the faculties and schools of agriculture varies according to country. It probably depends on the liaison between the various stages of agricultural education ; on the training facilities and means provided to farmers' sons who set out to reach the university via agricultural training ; on the number of years practical agricultural experience required before admission to the university ; etc.

c) Girls generally represent a very small proportion (1 to 13 per cent) of the total number of students.

d) An evaluation of the extent of agricultural education in Member countries can be made from the number of agricultural degrees awarded annually. The number of graduates per million of the active agricultural population is an index of comparison. It indicates the relative magnitude of this education in Belgium, Denmark, Italy, the Netherlands, Norway, Sweden and the United Kingdom (Table III).

e) The annual number of graduates should be compared with the occupations of past students. Such statistics are only available for certain countries. The chief employment outlets for graduates are research, education and advisory work. In the case of those countries for which statistics are available, it is found that 50 to 80 per cent of graduates secure their first job in agricultural services or in services connected with intellectual investment in agriculture. Relatively few agricultural graduates take up farming, except in Italy, the United Kingdom and Denmark.

Table III. STATISTICS CONCERNING HIGHER AGRICULTURAL EDUCATION

COUNTRY	NO. OF AGRICULTURAL STUDENTS AS PERCENTAGE OF TOTAL NUMBER OF STUDENTS	ACTIVE AGRICULTURAL POPULATION AS PERCENTAGE OF TOTAL ACTIVE POPULATION	GROSS AGRICULTURAL PRODUCT AS PERCENTAGE OF GROSS NATIONAL PRODUCT	PERCENTAGE OF SONS OF THOSE ENGAGED IN AGRICULTURE	NO. OF GRADUATES PER MILLION OF ACTIVE AGRICULTURAL POPULATION	PERCENTAGE OF GRADUATES IN AGRICULTURE AND RELATED FIELDS OBTAINING EMPLOYMENT IN		
						RESEARCH, EDUCATION OR ADVISORY WORK	AGRICULTURAL ADMINISTRATION	PRACTICAL FARMING
Austria	1.6	52.3	12	40	100			—
Belgium and Luxemburg	2.4	12.7	7	50	157			—
Denmark	3.5	23.6	17	80	212	50	52	20
France	0.9	27.7	?	35	63	29	59	
Germany	1.8	23.2	8	45	42		40	10
Greece	?	48.2	34	75	87	57	94	5
Ireland	6.2	39.6	27	80	86	76	79	4
Italy	1.1	32.8	20	30	106			27
Netherlands	2.5	19.3	11	30	138	64	69	12
Norway	4	25.9	12	65	270	60	85	10
Portugal	?	48.4	27	25	36			—
Spain	0.7	48.8	26	?	?			
Sweden	1.4	20.3	11	65	124	43	90	9
Switzerland	1.4	15.3	6	56	25	48	70	14
Turkey	5.7	—	46	x	36	60	80	5
United Kingdom	1.9	5	4	25	420	56	57	25

1. *Source :* "Higher Agricultural Education", E.P.A./O.E.E.C., No. 30, 1960. (See original document for comments on data.)

Section II : EDUCATIONAL TRENDS AND ECONOMIC AND SOCIAL DEVELOPMENT

59. As has been seen, economic growth affects the system of education in many ways :

"...in order to meet the economic and social needs of the nineteen-sixties, Europe will have to give its people what would until recently have been thought of as a luxury educational system. This implies that education for many people will become longer, in order to increase their expertise, and that it should also become broader in order to increase their possibility of contact with others and to guarantee them some freedom of movement as their specialisms become redundant or obsolescent. It should give everybody a general basis of culture essential alike for economic growth and human dignity"[1].

It would seem that, to meet the needs of economic and social development, the following is required of the educational system :

a) A considerable increase in the number of students, to meet both the increasing demand for qualified workers and the social needs of democratisation (mass education).

b) An effective system of educational guidance and re-guidance for pupils and graduates ; permeability of stages and types of education and of further education and re-adaption courses[2] extending beyond the normal period of school attendance ; organisation of education in conjunction with a permanent information system.

c) Development of general education and an increasing number of specialised courses to be followed at as late a stage as possible.

d) Adaptation of means and methods, so that an increase in the number of pupils will not be achieved at the expense of quality.

e) Organisation of a permanent training and information system.

An affluent society, far from constituting a threat, is favourable to educational development. It is no exaggeration to say that expenditure on education (and leisure) is a form of spending characteristic of an affluent society. It provides an ever-increasing number of young people with greater opportunities to acquire a culture and a technical training, which, in a poorer economy, are reserved for a privileged élite.

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[1] Some Economic Aspects of Educational Development in Europe. Op. cit., page 28.

[2] Clearly, whatever the level of general education, "re-adaptation" is the more difficult the longer the specialised training. An agriculturist cannot replace a doctor, and vice-versa. Hence the fundamental importance of guidance and re-guidance during the period of schooling.

60. While the foregoing may guide our definition of the basic trends in agricultural education which are linked to economic growth and development, the general trends are, however, influenced by national traditions and the local conditions of the agricultural population concerned. Nevertheless, it seems possible to agree on a number of basic principles to guide the future organisation of agricultural education, as has been shown by the conclusions and recommendations of the Conference of Directors of Agricultural Vocational Training, which was held at O.E.C.D. Headquarters from the 25th to 30th September, 1961[1].

61. 1. The growth of agricultural education is linked with economic growth, which brings culture and a vocational training within the reach of an increasing number of the young farming community. But, agriculture being the poor sector of all Western economies[2], any increase in the number of students will depend on the aid provided by the State for the development of agricultural education. Such aid should not only consist of the educational resources employed, but also of material facilities (collection of pupils, transport, living accommodation) and pecuniary aid (scholarships and conditions under which they are granted) made available to the sons of those engaged in farming.

The development of agricultural education is not only justified by considerations of economic efficiency, but also for reasons of social equity. In the more developed countries, the accessibility of the entire urban population to a secondary education will soon be an accomplished fact, and secondary education will experience an expansion similar to that of primary education at the end of the nineteenth century. A vigorous effort must immediately be made on behalf of the rural population if the disparity in the educational facilities available to different social and professional sectors is to be reduced or eliminated.

But the expansion of agricultural education obviously implies a parallel development in the living conditions and income of those engaged in farming, otherwise the development of education may merely contribute to accelerate the "exodus from the land". This may be necessary in some regions, but in others its desirability is doubtful. In any case, it would be a mistake to assume that an exodus from the land can be arrested by restricting an extension of education.

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[1] The basic reports relating to this paragraph are :

a) Agricultural vocational training in Europe and North America, O.E.C.D. Food and Agriculture Documentation Series, No. 52, 1963.

b) Professor G. Medici : Educational conditions for the development of agriculture, XIe I.C.A.E., 1961.

c) Professor L. Malassis : La formation et l'information des agriculteurs (training and informing farmers). Encyclopédie française, Vol. XIII.

[2] In nearly all countries, the proportion of national income represented by income from agriculture is smaller than the proportion of the total population who obtain their living from agriculture.

The basic problem of European economies is how to help agriculture to share in the general economic growth, in order to eliminate the disparities which are factors of discontent and difficulty.

62. 2. The structure of agricultural education is related to economic development, which calls for an ever increasing degree of social mobility. Moreover, the conditions of economic progress harmonise with certain of the social aspirations being formulated more and more clearly by those engaged in farming. This leads to certain consequences concerning educational patterns, the chief of which are as follows.

a) The organised growth of agricultural education depends on forecasting the probable evolution of the active population in relation to economic development. Vocational guidance services should be informed of the needs and demands of the agricultural sector so that a choice harmful to the future of that sector may be avoided. Moreover, by modernisation farming should offer prospects for the future which will avoid the loss of its most capable elements.

b) The increase in social mobility means that agricultural education must to an increasing extent be integrated into the general pattern of education[1], and that there must be freedom to change from the agricultural to other branches of vocational education or to general education, (the principle of the permeability of different branches of education).

This economic consideration accords with the aspirations of those engaged in farming, who regard any form of agricultural education which does not form part of the general structure of education as evidence of the isolation of agriculture within the nation. This "education apart" is sometimes regarded as "cheap" education and leads to it being ignored by the better elements.

In practice, the system of agricultural education should, as far as possible, reconcile the :

- integration of agricultural education into the general system of education ; and
- adaptation of training to the specific needs and conditions of the agricultural sector.

R. CHATELAIN observes that, in Denmark, Greece, Iceland and Turkey the organisation of agricultural training is on a different basis to that of other branches of vocational training. In Belgium, Portugal and Yugoslavia all vocational training is organised on a similar basis, while in France the harmonisation of general, technical and agricultural education was one of the guiding principles of the reforms instituted in January 1959 and August 1960.

The following recommendation was made by the directors of agricultural vocational training: "While recognising the necessity of adapting the organisation of vocational training to the specific conditions and needs of agriculture, the Conference recommended that the structure of this training should be harmonised with that of all other branches of education, to the extent found possible and desirable by the stage of agricultural development in each country". [(b): page 400].

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[1] This does not involve the question of which Ministry should be responsible for agricultural education.

c) To ensure that the highest level of education is accessible to all the most apt students, agricultural education should form an ascending whole rather than be a collection of separate self-contained establishments (principle of permeability of stages).

R. CHATELAIN observes that liaison and contact between successive levels of agricultural education are only satisfactory in eleven countries, and that in six others it is mediocre and sometimes even definitely poor. Liaison between vocational and university education is generally very poor. "In nine of the seventeen countries regarding which information on this point is available, the possibility of passing from one level to the other is practically non-existent, and in five other countries the possibilities are slight or very poor" [(b): page 56].

The conference of directors of agricultural vocational training declared itself in favour of better "synchronisation" and "particular emphasis was laid on the necessity for a good liaison between the highest level of agricultural vocational training at the 2nd stage and agricultural education at university level".

In fact, if agricultural education is to attract more pupils and democratisation be promoted, the highest level of education must be made accessible to all those having an aptitude for it.

63. 3. Economic growth and development result in an increasingly important place being given to general education in the curricula of vocational training. This tendency is not incompatible with specialisation at the various levels of education.

The increase in teaching of general subjects is justified by the following considerations.

a) General education is the common denominator of all social-professional categories.

b) The acceleration of technical progress has lead to the need to "learn to learn" rather than to acquire a set of formulae which may rapidly become out-of-date.

c) Education should prepare young people for all their future responsibilities — as man, citizen and producer.

d) A good general education facilitates the re-adaptation rendered necessary by economic development.

In practice, those who will engage in farming can obtain a satisfactory general education through two different systems:

a) in a general educational establishment; obtaining their vocational training later in an agricultural establishment;

b) by combining a general education with vocational training in an agricultural establishment.

Both of these formulae have advantages and disadvantages. At present formula (*b*) seems to be the one more generally adopted in Europe : it is claimed that it ensures a better orientation of general education (choice of basic subjects) ; a more satisfactory education from the pedagogic point of view by associating instruction in scientific subjects with the technical rules deriving from them ; and it limits the loss to agriculture of the better elements.

Whichever formula is finally adopted, the Conference of directors of agricultural vocational training "emphasised the increasingly essential and pre-eminent role of basic general and scientific knowledge" [(b) : page 399].

Vocational and specialised training is not incompatible with general education, but the specialised training should come at as late a stage as possible in the different levels of education. There has been a multiplication of specialised courses in Europe during the past ten years [(b) : page 32], whereas formerly vocational training in agriculture was of a general type. The Conference of directors of agricultural vocational training expressed the opinion that an intensified effort for specialisation is required at all levels. [(b) : page 400].

Moreover, it appears that technical progress creates a need for a proportionately greater number of middlegrade staff than of higher grades. The training of specialists for the processing industries and for different types of agricultural associations is particularly necessary.

64. 4. Generally speaking, economic growth tends to enlarge women's role in economic activity, and her level of education tends to rise. The reform of agricultural education instituted in France in 1960 has laid down that women should have access to the same level of education and training as men. There are, however, certain difficulties in the application of this principle, in which ideas on women's role, traditions and national characteristics play a decisive part.

65. 5. The development of agricultural education must be planned, mainly through ascertaining likely requirements in teaching staff and in material means. Teaching methods should be improved so that an increase in numbers is not achieved at the expense of quality. The most important aspect in the development of education is to reconcile an increase in numbers with the maintenance or improvement of quality.

In the coming years particular attention should be given to improving methods of planning agricultural education (see Chapter VIII) and teaching methods.

The conference of directors of agricultural vocational training emphasised the seriousness of the increasing difficulty in recruiting teachers encountered in many countries [(b): page 403] and, in view of the non-existence or marked inadequacy of pedagogic training of teachers, it "specially recommended that this situation be remedied as rapidly as possible." [(b): page 412].

66. 6. Economic growth and development stimulate the quest for new formulae to enable all, and especially adults, to acquire the knowledge they require, or for which they show an aptitude.

Since most European farmers have received no basic agricultural training, in many countries adult education is the best means by which to secure a rapid improvement in agricultural production and in the management of farms. This training can be provided through adult courses principally using accelerated training methods. and to some extent through the advisory services, which in recent years have also taken on the tasks of information and training.

Because of the acceleration of technical progress, information meetings and permanent information services must be provided even for young farmers. Indeed, these will become ever more effective, since they will be based on a more extensive general education and a better basic vocational training.

In certain countries, and notably in France, to meet the desire for equity and efficiency a system for "professional and social advancement" has been introduced. It enables men to educate and train themselves gradually, at any age, in a flexible manner and without possession of a diploma; thus enabling them to assume responsibilities commensurate with their true abilities.

Section III. THE COST AND PRODUCTIVITY OF EDUCATION:

research to be undertaken and means to be employed

67. Economic and social growth and development are characterised by an increase in the proportion of the national income allotted to education. One of the basic aspects of the strategy to develop education is to harmonise the increase in the number of students with the maintenance, and if possible improvement, of the quality of the education provided. The development of education therefore poses two basic questions:

I. The increase in its cost;
II. The improvement of its productivity.

68. An economic analysis leads to the conclusion that the evolution in the cost of education is not only the result of an increase in the number of pupils, but also of the increase of its relative cost. This conclusion is based on the fact that the cost of education is based on highly qualified work (2/3 of the total expenses relate to teachers' salaries), and that in a society which is becoming more and more capitalised the cost of labour increases relatively compared with that of capital.

Professor I. Svennilson and his colleagues have established a formula showing the economic components of education. This formula provides a basis for discussion of the evolution in the overall cost of education for a given economic ensemble and, once the parameters have been estimated, it enables costs to be effectively calculated. We have thought it useful to reproduce this formula, but for a more detailed study reference should be made to the original publication. Professor Svennilson's work[1] is, in fact, based on this formula.

The global expenditure for pupils in a given age group (U_i) can be calculated by using the formula :

$$U_i = P_i \times E_i \times T_i \times W_i \times (1 + K_i)$$

in which :

P_i = total population of children in the age group in question

E_i = rate of school attendance

T_i = quotient of the number of teachers per pupil

W_i = salary per teacher

K_i = coefficient of the salary and other educational expenses.

This formula may be applied to a given type of education, to a sector, a zone, or to the global economy[2]. It can serve as a basis for calculations relating to the agricultural sector, to estimate the evolution of the relative expenditure according to category, etc.

69. The increase in the social cost of education may justify research into improvements in the economic productivity of education. But such research also has sociological and pedagogic bases. It is justified by the need to adapt education to the needs of the various social-professional categories, and by the need to maintain, and if possible improve, the quality of education where this tends to become mass education. Little research of this type has been developed where the rural sector is concerned and "the pedagogic training of teachers is neglected in the great majority of countries". It is only regarded as satisfactory in Germany and Austria[3].

70. On a first examination, it seems that the most basic research to be undertaken can be divided into three categories[4] :

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[1] O.E.C.D. Targets for Education in Europe in 1970. Op. cit., p. 35 et seq.

[2] Professor Jan Tinbergen has also suggested a model which enables education to be quantitatively adapted to accelerated growth.

[3] E.P.A./O.E.E.C. — The Professional Training of Teachers in Vocational Agriculture Schools (Chatelain report), p. 27.

[4] J. Bartones : Basic research in progress or to be undertaken regarding educational development in the rural sector (Annex III).

a) Psycho-pedagogic research centred on observation of child and adolescent behaviour in the rural sector;

b) Psycho-sociologic observation centred on the study of rural communities and their conversion: individual and group psychology;

c) Economic research centred on the connection between economic growth, rural development and education, the methodology of educational programme planning, the cost of education, etc.

Educational research as a whole (as well as research concerning other forms of intellectual investment) calls, therefore, for the participation of psychologists, sociologists, economists and agronomists. It could be organised in specialised or non-specialised institutes working at the national level (in conjunction with general pedagogic institutes) and sometimes at the international level[1].

Such research should, *inter alia,* provide a basis for the:

a) improvement of educational guidance systems;

b) determination of the aims, structures, methods and means of education, information, further education, etc.;

c) preparation of pedagogic textbooks and leaflets providing logical information in an easily assimilated manner, account being taken of those for whom it is intended;

d) training and in-service training of teachers;

e) preparation of programmes for the development of agricultural vocational training in relation to overall economic growth;

f) construction of models to determine the economic optimum, having regard to training costs and psycho-social pressures, etc.

It is particularly desirable that O.E.C.D. take an interest in the organisation and operation of a "pilot institute", which would help European countries to develop research, and might have a considerable bearing on the evolution of education in the rural sector.

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[1] Recommendations of the Seminar (Annex II).

8

Chapter IV

INFORMING FARMERS

> *"It is becoming increasingly evident that the current transition of Europe's agricultural advisory activities from questions of purely quantitative increases of production to concern with the economic management of the individual farm is probably only a prelude to a close involvement in the much wider sphere of marketing... Efficient marketing is indispensable to the profitability of agrciculture"*[1].

71. In the system of intellectual investment represented by the formula

$$I = R + E + A + OF$$

the function of the advisory services[2] is to hasten the dissemination of new techniques, in other words, to reduce the time which elapses between the discovery of new agricultural means or techniques and their practical adoption. Progress in agriculture is the result of combined action by the research worker, who discovers new working means in his laboratory or office, by the advisory worker, who propagates the discovery and adapts it to particular conditions, and by the progressive farmer, who puts it to practical use. The adoption of a new idea by the producer depends on his receptivity to technical progress (which in turn depends on several factors, particularly on his degree of training) and on the receptive structures (some inventions do not affect production patterns, others entail a modification of these patterns if they are to be practicable).

Under our economic system, new production conditions are acceptable at the practical level only if, having regard to production and marketing patterns, they are a paying proposition. Once farmers become accustomed to economic calculations the propagation of technical improvements rests increasingly on an economic basis, hence the success of new advisory forms, such as management advice, in recent years.

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[1] The Role of Advisory Services in Developing Improved Marketing: E.P.A./O.E.E.C. Report "Agricultural Advisory Services in Europe and North America", 1960, page 234.

[2] In this report the more familiar term "advisory services" is used, although for several reasons the term "information" is preferable.

In more general terms, with an economy of affluence in sight, farmers have a growing tendency to consider the effect of new techniques and production means on the size of their income and on the conditions under which it is acquired (quantity and distribution of work, conditions under which it is executed, effect on family life, organisation of rest and leisure, etc.). Advisory work is thus acquiring a socio-economic content.

The socio-economic character of advisory work is now recognised in many countries. The decree of the 11th April 1959, which provided for the re-organisation of advisory services in France, stated that the aim of advisory work is "the diffusion of the technical, economic and social knowledge needed by farmers, especially to raise their standard of living and improve the productivity of their farms".

72. The O.E.E.C. organised a number of seminars and published many reports on the organisation and development of advisory services in Europe[1]. The Organisation's work has been particularly outstanding in the field of farm management, work study, and rural home economics. The international conferences of directors of agriculture and of agricultural advisory services enable a periodic comparison to be made of advisory service structures and methods, and contribute to the formation of a doctrine for the development of agricultural advisory services in relation to economic growth. An important contribution to the exchange of information amongst the participating countries has been made by the "FATIS" Review, which was founded in 1953 ; the present circulation in eight languages (English, French, German, Greek, Italian, Scandinavian, Spanish and Turkish) has reached about 30,000 per issue.

In this Chapter we consider how agricultural work has evolved during recent years, viewed in the wider context of "information for farmers". An endeavour is then made to select certain trends which affect the future of agricultural advisory work.

Section I. THE DEVELOPMENT OF AGRICULTURAL ADVISORY SERVICES

73. Agricultural advisory services are concerned only with certain aspects of the information required by the agricultural population. Information systems for agricultural communities have complex structures and methods, and the information services for these communities have seldom been subjected to global analysis. It would,

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[1] Food and Agriculture Documentation Series :
No. 8 — "Agriculture Advisory Services in O.E.E.C. countries in the Mediterranean area".
No. 36 — "Agricultural Advisory Services in Europe and North America" (1960).
F.A.O. The improvement of agricultural advisory services in European countries. 1954.

however, be desirable to have an overall picture of the position, if only to accurately estimate the value of these services (I).

Remarkable progress has been made in Europe in recent years; advisory work has increased in intensity (II) and its scope has been widened (III). Amongst the new forms of advisory activities, work study, farm management, marketing of agricultural products, and rural home economics have acquired, or will acquire, increasing importance.

I. INFORMATION SYSTEMS FOR AGRICULTURAL COMMUNITIES

74. Information systems for agricultural communities are many and complex. Some are general information systems, whilst others deal only with agricultural information. For the sake of convenience these systems are grouped into four main categories[1].

i) General information systems (Gi).
ii) Commercial agricultural information systems (Ci).
iii) Governmental (or public) agricultural advisory systems (PAS).
iv) Agricultural advisory systems instituted by farmers' organisations (Pr. AS).

The information structures for rural populations may be represented as follows:

$$\text{Im} = \text{Gi} + \text{Ci} + \text{PAS} + \text{Pr. AS}$$

We might distinguish information systems according to the relative importance of each.

a) *General Information Systems*

75. General information systems reach the various professional sectors of the population through the press, radio, television, films, publications, etc. Numerous surveys have shown that, for various reasons, farmers benefit less by the general system of information than do other professions.

From the point of view of those engaged in agriculture there are three sources of information to be considered: (*i*) from the dissemination centres to the various socio-professional groups; (*ii*) in particular from these centres to farmers; and (*iii*) from farmers to the dissemination centres.

i) The general information agencies help to form public opinion on agriculture and on those engaged in farming. The type, quality and frequency of articles on agriculture in the national press are of importance in democratic countries. But in some countries such articles are relatively rare and urban communities often lack understanding of rural needs.

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[1] Our observations here are based on a study by L. ESTRANGIN "Stratégie de la propagation de l'information technique dans les milieux agricoles". Economie appliquée, No. 23, 1961, page 383 et seq.

ii) The general information agencies sometimes disseminate articles specially prepared for those engaged in farming and distribute publicity of special interest to them.

iii) The farmers' organisations and farmers' representatives can themselves inform the dissemination centres by suitable means (press conferences, distribution of information sheets, exhibitions, etc.). Indeed, those engaged in farming do not always attach sufficient importance to this form of action, and seem to be partly to blame for the lack of understanding shown them by urban communities.

b) *Commercial Agricultural Information Systems*

76. These are organised by the firms which supply production tools to the agricultural sector and those which process and distribute its produce. It is probably the most intensive form of information for farmers in Europe[1]. It is important because of the ever increasing commercialisation of agriculture, and because commercial undertakings employ powerful systems, subject farmers to calculated and repeated pressure, and employ modern methods inspired by psycho-sociology.

Agriculture is becoming commercialised on the *sales* side and on the *purchases* side (reduction of the self-sufficiency of the farm). This commercialisation appears to be most in evidence on the purchasing side. The evolution is explained by the increasing use of fertilisers, mechanisation of farms, campaigns against crop and livestock diseases, development of non-traditional forms of production by purchasing food for livestock, etc. As a result, purchases by agriculture represent, on average, an important proportion of the total cost of production, and on some farms the major part of this cost.

Mr. Estrangin writes: "It would be interesting to know how many contacts a farmer has in fact with salesmen and how many with disinterested technicians. Except for a few privileged farmers, the proportion must be about a hundred to one !"[2].

The value of information supplied by commercial interests varies: it is less doubtful when based on controlled experiment or demonstrations, and more open to doubt when based on psychological arguments. Even assuming its objectivity, commercial information has two main disadvantages. It is incomplete (referring only to marketed tools and products) and the intensity of the information supplied depends on the standing of the firms in question. These disadvantages are, however, being reduced by the organisation of associations embracing groups of firms interested in various aspects of agricultural progress[1].

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[1] We wish to express our thanks to Professor Smart, who drew our attention to this point.

[2] L. Estrangin : op. cit., page 390.

c) *Governmental Agricultural Advisory Services*

77. At the end of the nineteenth and beginning of the twentieth centuries in the more developed countries the State undertook to organise information services for farmers. For a long time this information was almost exclusively technical, but it has gradually assumed a more economic character, especially since the last war.

Official advisory services have played a decisive role in the propagation of technical progress in agriculture. In 1959 the total number of full-time agricultural advisers employed in Government agencies was still much higher than those employed by other bodies.

TABLE IV. DISTRIBUTION OF FULL-TIME AGRICULTURAL ADVISERS IN 1959 AS BETWEEN GOVERNMENTAL SERVICES AND OTHER ORGANISATIONS

COUNTRY	GOVERNMENT AGENCIES	OTHER ORGANISATIONS	TOTAL
Austria	699	27	726
Belgium	295	50	345
Denmark	0	742	742
France	940	800	1740
Germany	1878	317	2195
Greece	469	—	469
Iceland	13	27	40
Ireland	527	—	527
Italy	—	—	2000
Luxemburg	—	—	—
Netherlands	1219	—	1219
Norway	664	—	664
Portugal	—	—	—
Spain	594	—	594
Sweden	469	—	469
Switzerland	17	—	17
Turkey	1612	431	2043
England & Wales	1182	450[1]	1182
Scotland	291		291
Northern Ireland	66		66
Yugoslavia	976	2100	3076

[1] Approximate.

Source : Agricultural Advisory Services in Europe and North America, p. 61 et seq.

The creation of these services was justified by the artisan structure of agriculture, which comprised a large number of small farms unable, like big industrial and commercial firms, to organise their own information networks, and by the low educational level of those engaged in farming and their poor receptivity to technical progress. Agricultural information services have taken the form of "public transmission and distribution systems".

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[1] In France, for example, the "Association pour l'encouragement à la productivité" embraces a group of industries supplying agriculture, and consider the modernisation of agriculture under its different aspects.

The basic advantage of this structure is that it ensures neutrality and objectivity, and enables the information to be based on experiment or demonstration. There have, nevertheless, been occasions where it was possible to question the State's neutrality, and advisory services have sometimes been regarded as instruments of "policy". But the consultative character of advisory services, and their activities to improve farmers' incomes and living standards, is increasingly evident in Europe.

d) *Agricultural Advisory Services instituted by Farmers' Organisations*

78. Farmers have become much more aware of the value of information, and especially of agricultural advisory services. They have organised themselves to collect and sift information, or have successfully sought to be associated with the preparation of programmes, recruitment and supervision of advisers, etc. Professional action in this direction was encouraged at a very early stage in some countries. In others, particularly in France, Germany and the Netherlands, an increasingly important role is played by farmers in the planning and organisation of advisory services. (In Denmark the advisory services are organised by the farmers' organisations, by whom the advisers are employed.) Indeed, the progressively larger part being played by the agricultural profession appears to be one of the basic trends in the organisation of advisory services in Europe[1].

As participation by farmers increases the pattern of information systems change. They tend to be transformed from "public systems for the distribution of information" into "professional systems of collective information", and this "collection" is effected mainly at the level of the farmers' organisations.

A typical example of this evolution is the formation in France of Technical Agricultural Study Centres (C.E.T.A.), and more recently the advisory groups.

This development in the organisation of advisory work is related to the economic and social development which has taken place in agriculture. It reflects farmers' realisation of the importance of information and is an expression of their sense of responsibility and social ambition.

79. The various types of information system mentioned above

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[1] Farmers participate in the organisation and planning of advisory services chiefly through "advisory committees", which exist in various forms in England Wales, France, Germany, the Netherlands and Turkey ("Agricultural Advisory Services in Europe and North America", page 56).

exist side by side in most countries, and they maintain a more or less close liaison. There is a tendency in many countries to develop mixed advisory systems which co-ordinate public and private initiative in this field. The agricultural press is supplied in varying degrees by all systems, and endeavours to meet all the farmer's information needs[1]. These needs are constantly expanding. They concern the technical, economic and social aspects of agricultural development and, to an ever-increasing extent, the situation, evolution and role of agriculture in the overall development of the economy[2]. The agricultural advisory services, whether governmental, private or mixed, meet only a part of these needs, although their field of action shows a constant tendency to expand. We shall consider this below.

II. STATISTICS ON THE DEVELOPMENT OF AGRICULTURAL ADVISORY SERVICES IN EUROPE

80. Agricultural advice is given by advisers, employed either by the public authorities or by farmers' private advisory services, which may or may not be subsided. In all European countries except Denmark, Iceland and Yugoslavia, agricultural advisers are exclusively or mainly Government agents. In France the number of advisory workers employed by non-official bodies is, however, almost as great as that of advisory workers employed by the State services; and in Germany and Turkey their numbers are also relatively important (see Table IV).

In the following paragraph we shall deal, not with the organisation of advisory services which has been outlined in the preceding paragraph, but with the overall development of agricultural advisory services in Europe.

81. Table V has been taken from the E.P.A./O.E.E.C. publication "Agricultural Advisory Services in Europe and North America". It is based on the results of a statistical survey carried out by the O.E.E.C. The figures shown include both government and private advisory services. With a view to comparing the degree of development of the different forms of advisory services in Europe, we have calculated, per adviser, the number of hectares of agricultural land, the number of farm units, and the number of males actively engaged in agriculture. But these figures alone do not indicate the intensity of advisory activities in the different countries. Account would also need to be taken of the efficacy of the advisers, together with their level of training, with the organisation of the advisory services, the relative number of specialist and general advisers, and the harmonisation of their respective activities.

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[1] In its "Food and Agriculture Documentation Series" the O.E.E.C. issued a "List of agricultural press and periodicals in O.E.E.C. Member countries" (No. 28).

[2] Farmers are becoming increasingly attentive to the relative evolution of the different economic sectors and their aspiration to "parity" is an expression thereof.

The following remarks are made in regard to Table V :

a) The number of part-time advisers is relatively high in France, Germany and, especially, in Switzerland. The large number of part-time advisers in Germany and Switzerland is due to the close co-operation between vocational training and the agricultural advisory services. In Germany, "all the teachers at the agricultural technical schools are active farm advisers" and in Switzerland "the agricultural schools are the centre of all agricultural advisory work"[1].

In France the explanation is of different kind, and the number of part-time advisers is due to the pattern of the advisory services, and especially to the fact that a large number of agricultural organisations only employ part-time advisers.

b) Since it was impossible to convert part-time advisers into "units of full-time advisers" our calculations only take account of full-time advisers. The numbers are, therefore, reduced for France and Germany, and are of no significance in the case of Switzerland, for which they have not been shown.

c) The most significant measure of the intensity of advisory activities is the number of farm units per adviser. The "simple average" for all countries for which statistics are available is about 700.

In most Northern European countries the intensity is above average, whilst in all Mediterranean countries (including France) it is below average. Since the Northern countries are relatively highly industrialised, it may be assumed that this geographical pattern is related to the level of economic development. The attached graph, on which has been indicated the percentage of total active population represented by active agricultural population in absciss, and the number of farm units per adviser in ordinate, broadly confirms this assumption.

82. This basic finding fits in with that made concerning total intellectual investment and can be expressed as follows :

> The more highly industrialised a country, the greater the expenditure on agricultural advisory services" or, considering the question in a dynamic perspective, "the development of agricultural advisory services is linked with that of the non-agricultural sectors.

However, a strong dispersal can be observed, and this diminishes the significance of the trend and marks the original effort made by some countries to improve agricultural productivity.

Where advisory services are financed by the State they can be regarded as a contribution approved by the non-agricultural sector to ensure the harmonious development of the whole community ;

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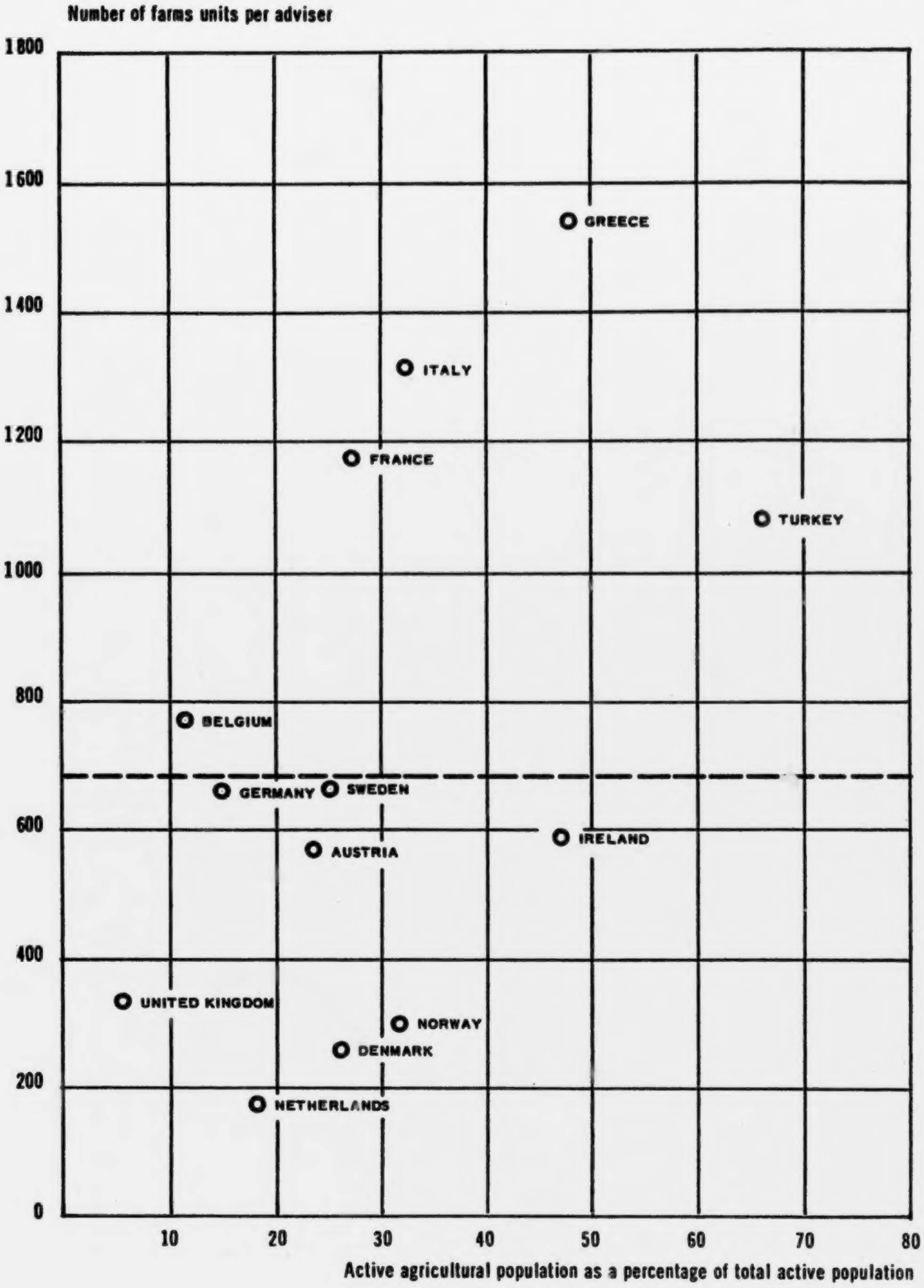
[1] "Agricultural Advisory Services in Europe and North America". Op. cit., page 45.

Table V. INTENSITY OF FARM ADVISORY ACTIVITIES IN EUROPE

COUNTRY	ADVISERS (1959)		AGRICULTURAL AREA (THOUSANDS OF HECTARES)	NUMBER OF FARMS OF MORE THAN 1 HECTARE	NUMBER OF MALES ACTIVELY ENGAGED IN AGRICULTURE, FORESTRY, HUNTING AND FISHING	NUMBER OF HECTARES PER ADVISER	NUMBER OF FARMS PER ADVISER	NUMBER OF MALES ACTIVELY ENGAGED IN AGRICULTURE PER ADVISER
	FULL-TIME	PART-TIME						
Austria	726	—	4,080	369.361	512.5	5,619.8	508.8	705.9
Belgium and Luxemburg	345	—	1,876	263.062	382.3	5,437.7	762.5	1,108.1
Denmark	742	—	3,126	189.190	381	4,212.9	255	513.5
France	1,770	1,380	39,074	2,117.444	3,387.9	22,075.7	1,196.3	1,914
Germany	2.195	1,483	14,250	1,508.000	2,316.3	6,492	687	1,055.3
Greece	469	67	(8,790)	719.831	1,152.3	18,742	1,534.8	2,456.9
Ireland	527	—	5,918	303.700	436.2	11,229.6	576.3	827.7
Italy	2,000		20,899	2,705.185	5,093	10,449.5	1,352.6	2,546.5
Netherlands	1,219	17	2,310	233.072	578.5	1,895	191.2	474.6
Norway	664	3	1,034	189.885	332,7	1,557.2	286	501
Portugal			4.940	453.099	1,348.2			
Spain	494	73						
Sweden	469	28	4,405	333.117	578.7	9,392.3	710.3	1,233.9
Switzerland	17	306	2.174	163.700	325.3			
Turkey	2,043	—	53,817	2,077.000	4,341	26,342	1,016.6	2,124.8
United Kingdom ..	1,539	97	19,383	481.410	1,025	12,594.5	312.8	666

Sources: "Agricultural Advisory Services in Europe and North America", op. cit.
Food and Agriculture Statistics, Paris 1959 (the data is determined from the latest censuses).

INTENSITY OF ADVISORY ACTIVITIES AND THE LEVEL OF ECONOMIC DEVELOPMENT



Sources : Active agricultural population as a percentage of total population : Food and Agriculture Statistics, Paris 1959, page 8, table 4.

Number of farm units per adviser : Table 5.

the development of agricultural advisory services being one of the means for increasing the productivity and incomes of the agricultural sector.

The geographical differences existing between more advanced and less developed countries demonstrate once more the need for concentrated action in the Mediterranean countries and for the planning of specific activities for these countries.

III. RECENT DEVELOPMENTS OF ADVISORY WORK

83. Agricultural advisory work includes only a part of the information required by farmers, but a fundamental feature of recent development is the extension of advisory services' fields of activity. This extension concerns especially:

a) Agricultural work study;
b) Farm management;
c) Marketing of products;
d) Rural home economics.

This extension has affected the pattern and spirit of the advisory services in many ways. It is no exaggeration to say that the character of advisory work is undergoing a change.

a) *Work Study in Agriculture*

84. On small farms, labour often constitutes the biggest item of production costs. Together with social and economic development, the agricultural population is declining, work is being mechanised (mechanisation of farming, and of methods of handling agricultural supplies and products) and workshops are being rationalised (conversion of land structures, modernisation or construction of buildings to save labour, etc.). Work study aims both to increase labour productivity (and farm income) and to improve working conditions. A reduction of working hours; an extension and organisation of paid holidays; a lessening of women's work; a diminution of the arduousness of work in general; all meet the aspirations for an improved well-being of the rural population.

"Work study is the science of the use of the human resources; including economical, technical, physiological, psychological and social features"[1].

A big development in work study took place in Europe during the period 1955-1960. The number of experts in this field increased from 50 to 150[2] and their work in conjunction with the agricultural advisory services appears to be of particular importance in the Netherlands. European advisory services increasingly admit that in the scope of their activities "work study must be regarded as an integral part of farm management".

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[1] Dr. A. MOENS: "Promotion of Work Study in Agriculture and Horticulture" — E.P.A./O.E.E.C. Food and Agriculture Documentation Series, No. 36, page 214.

"Promotion of Work Study in the Agricultural and Horticultural Advisory Services", O.E.C.D. Food and Agriculture Documentation Series, No. 39.

[2] Dr. A. MOENS: Op. cit., page 215.

b) *Farm management*

85. In recent years farm business analysis and improvements in management methods have met with considerable success in Europe, and remarkable progress has been made. This evolution is related to that which has taken place in the attitude of farmers. It benefits by the activity of an ever-larger number of research workers, specialists and advisory workers and by the attention given to this question by international bodies.

In Portugal some one hundred farms are under management observation, in Greece about 300, in Belgium about 1,000, in Switzerland and in France about 10,000, in the Netherlands about 5 per cent of all farms. With rare exceptions, in all Member countries "the stage at which the purely technical approach to advisory work, which is fundamental in the formative and early years of any advisory service, is giving place to a combined technical and economic approach"[1].

A decisive role in perfecting and making known farm business analysis and management methods in Europe has been played by the E.P.A./O.E.E.C. Many seminars and meetings have been organised on this subject and publications distributed[2]. An important feature in the development of methods (comparison by graphs and tables, budgets, programmes, models) is the introduction of quantity and price forecasts, i.e. economic forecasts. Management progress depends increasingly on progress in forecasting and economic planning methods.

86. The development of farm management has achieved many results. It has made possible a better knowledge of the real patterns of production (socio-economic analyses of farms), has shown the importance of calculating the means and results per labour unit, has contributed to the economic improvement of farmers in regions of family farms and has influenced the patterns and methods of advisory work.

Management has introduced an economic perspective into the advisory services. The choice of means, methods and products and their co-ordination within the farm unit are based on economic calculations, with a view to improving the income of the farmer and his family (obtained under normal working conditions). It has furnished a method for the general field adviser who looks at the farm as a unit, isolates the weak spots, concentrates attention on them and picks out items calling for priority action. In the most advanced countries management is tending to become the basic means of action for advisers. In the Netherlands, for instance, it is estimated that the agricultural adviser devotes about 40 per cent of his time to farm analysis and management advice.

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[1] E.P.A./O.E.E.C. Food and Agriculture Documentation Series, No. 36, page 53.

[2] Amongst the most recent international publications relating to farm management are :

"Farm Business Planning Methods". O.E.E.C., December 1960.

"Programme Planning". O.E.E.C., No. 45.

F.A.O. "Methods of Farm Management Investigation for Improving Farm Productivity".

The development of management also influences the general economy, and even economic policy, in many ways. Methodical programme planning of a farm entails definition of a long-term agricultural policy or even overall programme planning.

87. The development of the analysis of farm structures and results has certainly helped to draw attention to the problem of low-income farms, and to the need for a change in the patterns of agricultural production. At their second international conference, the directors of agriculture and directors of agricultural advisory services in Europe and North America expressed the opinion that "One of the mots important contributions which could be made by advisory services in relation to the viability of small farms and other farms of a 'low-income' status lies in extending the advisers' knowledge, and the practical application of farm management in advisory work. The Conference emphasised that this aspect should be given full weight in the training of advisers whether at the pre-service or in-service stages, and agreed that in view of the numerous small and 'low-income' farms in many European countries, the highest priority should be given to pre-service and in-service training in farm management"[1].

If it is to be effective, activity of this kind by advisory services should be co-ordinated with plans to form viable farm units. Many countries are devoting their attention to this, which should contribute to a better use of the available resources and to reducing the difference between the incomes of the agricultural and other sectors.

c) *Marketing of agricultural products*

88. The need for agricultural economists has been increasingly felt since the last war, and the number of farm management experts and technicians who have been trained in this field is constantly increasing in Europe; but experts in the marketing of agricultural products are still few.

As early as the end of the nineteenth century in some countries advisory services helped farmers to organise and operate co-operatives, but the help provided seems to have been directed towards the propagation of co-operative principles and the establishment of internal laws and regulations, rather than towards a methodical analysis of marketing problems and the improvement of distribution methods.

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[1] Food and Agriculture Documentation Series, No. 36, page 13.

Amongst the factors which to an increasing degree lead to greater interest in the marketing of agricultural products are : high distribution costs of foodstuffs[1], growth of processing industries and their increasing influence on the orientation and valorisation of agricultural products ; the emergence of new types of relationships between producers and distributors of raw materials or finished products (integration contracts) ; the evolution in the outlook of farmers, and their desire to in various ways build up the "compensatory power" referred to by K. **GALBRAITH** ; the demands of consumers who often live far from the place of production ; the development of a co-ordinated international economy (European Economic Community); the prospects of an economy of affluence.

89. Relatively little research into the marketing of agricultural products is carried out in Europe, and few countries have national specialists to give marketing advice. In some cases research, studies and information services have been developed within non-specialist or specialist organisations, but in most cases such action is incomplete and not well co-ordinated. Few European countries possess a doctrine on the role and methods of research and advisory work in the field of marketing.

The O.E.E.C. helped to draw the attention of European countries to the importance of these problems, and published a number of very useful reports[2], but the United States would seem to be the most advanced country in the field of advisory work in marketing and its experience provides useful material for our study of the subject.

90. The role of advisory work in the development and improvement of marketing methods was described by Gerald H. **HUFFMAN** at the second international conference for directors of agriculture and of agricultural advisory services in Europe and North America[3].

"The 'Lever' Act of 1914, under which advisory action was first organised in the United States, already contained a provision whereby the 'itinerant teacher or demonstrator' should pay 'as much attention to the economic aspects of agriculture — marketing, standardisation and grading of agricultural products —' as to the improvement of yields as such".

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[1] Of the $58 billion spent on food in the United States in 1958, the farmers received only $19.7 billion. In 1958 the farmer received only 38 cents out of each dollar spent on food, compared with about 47 cents in 1950. (E.P.A./O.E.E.C. Food and Agriculture Documentation Series, No. 36, pages 229-230).

[2] In the E.P.A./O.E.E.C. Food and Agriculture Documentation Series Nos. 3, 4, 6, 7, 10, 12, 15, 15, 16, 18, 19, 21, 22, 24, 25, 29, 31, 32, 33, 34, 40, 42, deal with marketing and consumer education (they constitute approximately 50 per cent of the volumes published in this series).

[3] Paper published in No. 36 of the E.P.A./O.E.E.C. Food and Agriculture Documentation Series, pages 227 to 234.

The Research and Marketing Act passed by Congress in 1946 states: "It is further declared to be the policy of the Congress to promote through research, study, experimentation and through co-operation among the Federal and State agencies, farm organisations, and private industry, a scientific approach to the problems of marketing, transportation and distribution of agricultural products, similar to the scientific methods which have been utilised so successfully during the past 84 years in connection with the production of agricultural products, so that such products capable of being produced in abundance may be marketed in an orderly manner".

91. Mr. G. H. HUFFMAN shows how, as a result of this legislation, studies and advice on marketing has progressively developed.

Marketing is a complex ensemble. The marketing advisory services in the United States have three basic objectives: (*i*) to reduce marketing costs; (*ii*) to enlarge market outlets; (*iii*) to help those concerned to understand marketing operations, in order to make the latter more rational and to give competition full play. These advisory services are not directly concerned with market reports and have no administrative functions relating, for instance, to the definition and control of qualities and standards. It should in particular be noted that once an evolution has taken place, marketing advice applies with almost equal importance to producers, distributors and consumers. The experts in this branch of advisory work are, therefore, directly concerned with distribution firms and consumer education. In 1958 the United States spent $35 million on research in the marketing and use of agricultural produce and, although funds devoted to this branch of advisory work have not exceeded 6 to 7 per cent, a substantial increase is anticipated.

92. We consider it essential, by way of conclusion, to quote the recommendations made at the second international conference for directors of agriculture and of agricultural advisory services in Europe and North America.

..."The Conference agreed that it is essential that the advisory services take an increased and more active interest in promoting the improvement of marketing of agricultural products, including appropriate action with consumers. The particular action taken will naturally depend on the conditions in each country. In some countries large integrated farmers' marketing organisations have been established which have employed specialist advisers in marketing work. It appears evident that many countries in Europe will follow a similar course to that already adopted by the Co-operative Extension Service in the United States. The approach should as far as possible be a vertical one following the major products from the producer right down to the consumer. It is now being rapidly realised in all countries that efficient marketing is indispensable to the profitability of agriculture and that both producers and consumers have a common interest in the part which can be played by advisory services which are supported from official funds.

In this connection it was noted that the work in this field by the United States extension service had helped to bring about an even greater support from the farming population than heretofore, and had also played an important role in securing popular support for the provision of finances for these services. The value to producers and consumers, as well as to all intermediate groups in the marketing process, of this initiative by the Co-operative Extension Service in the United States was fully recognised and supported by the members of the E.P.A./O.E.E.C. Mission of Directors"[1] .

d) *Rural home economics*

93. Considerable work in this field has been done in recent years by the advisory services. The O.E.E.C. organised many seminars and published a number of basic reports on the relation between rural home economics and development projects[2] ; on the specific problems of the Mediterranean areas[3] and on programmes for future activities.

The scope and role of rural home economics advisory work is becoming increasingly clear. Whereas farm management is centred on the *improvement of income,* rural home economics deals with the *optimum utilisation of income.* In this perspective the items appearing in the consumption budget can be used as a basis for planning action in this sector. Such items are : food ; housing, clothing ; health and hygiene. Education, culture and leisure might also be included. Reference only to consumption budget items gives an excessively narrow view of rural home economics. Obviously, a more general account must be taken of women's role in rural life. It can be considered from four basic points of view :

i) she supplies labour for executive tasks on the farm ;
ii) she participates in the general management of the farm or manages certain branches of production ;
iii) she manages the home ;
iv) she participates in the vocational life (as a member of various organisations) and in social life.

The relative importance of the different functions of women in rural life is related to national customs and to levels of advancement. In all cases it entails the employment of suitable methods and means, of which account must be taken by rural home economics advisers.

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[1] Extract from "Agricultural Advisory Services in Europe and North America, 1960", page 14.

[2] O.E.E.C. — Food and Agriculture Documentation Series No. 26 : "The Contribution of Home Economics towards Rural Development Projects". July, 1960.

[3] O.E.E.C. "The Specific Problems of Rural Home Economics Advisory Work in the Mediterranean Area", January, 1961.

94. Rural home economics research centres have been established in a number of countries, including France (Rennes), Germany (Stuttgart-Hohenheim) and the Netherlands (Wageningen). Rural home economics advisory work would seem to play an important role in all countries, but more especially in areas in the course of economic development. The present extent and structure of the rural home economics advisory services in Europe varies considerably from country to country. In some (Belgium, Germany, Greece, the Netherlands, Scandinavia, etc.), the services are highly developed; in others (France, Italy, Spain, etc.) it is proposed to increase or to establish them; while others (England & Wales) do not propose to develop this form of action[1].

CONCLUSION ON CERTAIN ASPECTS OF THE DEVELOPMENT OF AGRICULTURAL ADVISORY WORK IN EUROPE

95. Agricultural advisory work has been intensified and expanded in recent years. Farmers have recognised the importance of advisory activities and have become receptive to new forms. The traditional form, with a technical bias, tends increasingly to give way to new forms of a socio-economic type.

The purpose of advisory work in the past was to propagate good production techniques. In its present state of development advisory work tends more to be directed towards improving the well-being of the agricultural population. From this development some lines of action for the future can be picked out.

Section II. TRENDS IN AGRICULTURAL ADVICE CONSIDERED IN RELATION TO ECONOMIC AND SOCIAL DEVELOPMENT

96. Agricultural advisory activity has intensified in recent years (increase in number of advisers) and the duties of advisers have been extended. This development has affected the structure and methods of advisory services in many ways. It is probable that the movement which has already begun will continue. "A service that does not evolve is a dead service". If these services are to continue to adapt their structure and methods to the requirements of economic and social development, they will have to show a spirit of innovation. To a certain degree, the efficacy of their action is bound up with the development of research in the human sciences, especially in those of economics, sociology and psychology.

Although the orientation of advisory work in European countries is linked with national traditions, certain basic trends can, nevertheless, be detected. Indeed, this has been shown by the conclusions and recommendations of the conference of directors of agriculture and of agricultural advisory services in Europe and North America.

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[1] Agricultural Advisory Services in Europe and North America. Op. cit., page 49.

97. 1. Advisory work is similar to other forms of intellectual investment in that its importance is in proportion to the level of general economic development[1]. The highest density of farm advisers is found in the most advanced countries (which are also the most highly industrialised). It is true that expenditure on the advisory services helps to improve agricultural productivity and contributes to general progress, but the development of advisory work in the more advanced countries is also explained by the fact that, since incomes are relatively higher, it is easier to find the funds necessary to provide a better remuneration to a greater number of advisers.

It is certain that the number of advisers will continue to increase, especially in countries in the course of development, and that this increase will be related to general prosperity. Advisory work has proved its worth in most countries, and farmers, public authorities and politicians have realised its importance.

It may be doubted whether substantial margins for growth still exist for the advisory services in the more advanced countries. The Netherlands has apparently achieved the highest density of agricultural advisers in the world. In those parts of the Netherlands with the highest density there are about 150 farm units to each adviser. This density is explained by the nature of Dutch agriculture, which is very intensive and highly developed (market-gardening, flower-growing, etc. are of great importance). Nevertheless, the sponsors of advisory work in the Netherlands think that the number of specialists, as well as of "commercial advisers" (especially of co-operatives), will increase[2].

The effect of the development of agricultural education on the growth of the advisory services might also be considered. It is a fact that in recent years the advisory services in many European countries have undertaken teaching tasks as well as information tasks. With the development of agricultural education, the work of the advisory services in this field may be reduced. However, in a number of countries, even amongst the most advanced, it has been found that the demand for advice is intensified as the farmers' level of education improves.

A substantial margin for the expansion of advisory services in Europe still exists; it is related to the rise in income, the increasing complexity of agricultural activities and the extension of advisers' functions. This margin for development is particularly great in the Mediterranean countries.

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[1] We think there is a stronger correlation between the number of agricultural advisers and the average income per head of population than between the number of advisers and the income per farmer. However, due to the present lack of statistics, we are unable to prove this by suitable calculations.

[2] Discussion with Mr. KRUSE during visit to the Netherlands.

98. 2. As advisory work becomes more intensified it also expands. In all countries it is showing a tendency to develop progressively from the technical to the socio-economic stage. We have already mentioned, when dealing with recent forms of advisory work, that in the past advisory work dealt mainly with good production techniques, but that it now shows an increasing tendency to consider the welfare of rural populations.

In a preliminary examination, the factors of socio-economic well-being may be grouped into three categories :

a) the size and stability of income (which determines purchasing power) ;
b) the manner in which the income is obtained ;
c) the manner in which it is spent.

99. The main objective of *technical* advisory work was to increase physical yields. The purpose of *economic* advisory work, centred on farm management, is to increase the economic yield of farm units and farmers' incomes. Most agricultural advisory services in Europe have acquired an economic bias but, as Mr. Gerald H. HUFFMAN has so aptly remarked, they are unlikely to limit themselves to management and, on the assumption that an improvement in the rentability of farm units entails modernisation of the food industry and distribution circuits, they will necessarily deal more and more with marketing advice.

100. A similar income can be obtained with very differing amounts of labour and effort. Under a peasant system of agriculture, with low incomes, man is dominated by facts and "counts neither his work nor his efforts". But under an advanced agricultural system man organises his work and his life. One can even speak of a trend where, as incomes improve, the manner in which additional income is obtained tends to acquire as much importance as the income itself.

In other words, economic growth tends to give a value to work study insofar as the purpose of these studies is to reduce the total amount of work, achieve a better distribution of time, reduce the effort required of the worker, provide for leisure and reduce women's work. We are, therefore, led to believe that in future advisory services will devote more and more time to problems connected with work study in agriculture.

101. Equivalent incomes may be spent in very different ways. To some extent rural home economics consists in teaching how to spend, and therefore how to improve family well-being.

In an economy in the course of development rural home economics aims to improve the family well-being by improving a subsistence economy. In order to ensure a more balanced diet it devotes its attention to crops intended for self-consumption and for preservation. It gives advice to the family on housing improvements, endeavours to ease women's work which is often too heavy and irrational, etc. In a developed economy, where an increase in household purchases results from the commercialisation of agriculture and the improvement of incomes, home advice acquires a different content. It tends to deal with such questions as the choice of a washing-machine and other household appliances[1], the rational equipping of the home, or even the organisation of leisure — if desirable by facilitating the establishment of clubs for rural families, etc.

102. Obviously the new forms of agricultural advisory work, such as farm management, marketing, work study and rural home economics, are interrelated, and their common aim is to improve the well-being of rural families.

Once advisory services have taken this direction, they will probably extend their activities, if they have not already done so. Regional planning aims, in varying degrees in the different countries, to rationalise production patterns, to facilitate the use of collective equipment and the development of a social life, and to reduce the inequalities between urban and rural areas and between different regions. Electrification, water supplies, roads, land consolidation, housing improvements, telephones, improved sanitation, decentralisation of industry, the provision of health and social services, collection of school children, vocational guidance — all influence production conditions and human relations and call for new information services.

Obviously such an extension of needs requires an inventory and makes the allocation of responsibilities necessary. Two fundamental questions seem to arise in all countries.

a) What kind of information do rural communities require, having regard to the economic and social evolution that is taking place in rural areas? An inventory must be prepared.

b) Having determined the information requirements, the existing or future information systems capable of meeting these needs must be ascertained. This raises the question of the distribution of responsibilities and inevitably otf the partial or complete co-ordination of activities.

103. 3. The growth and development of the advisory services inevitably entails a modification of structures and methods.

The preparation of programmes of action entails estimates and, where there are complex ensembles, action implies co-ordination. Advisory planning entails estimates of future staff requirements and of the duties to be assigned to advisers. The number of technicians to be trained by the educational system at different levels, and the type of training that must be given them, will be deduced from these estimates. Since a relatively large number of agricultural graduates are employed in the advisory services, the trend of university education will inevitably be influenced by the changes in the requirements of these services. It is likely that in many countries, to a greater extent than previously, this branch of education will have to produce agricultural graduates well trained in work study, farm management, marketing of products, rural home economics and rural sociology, and it will also have to provide in-service training and information meetings for advisers.

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[1] Our attention was drawn to this point as a result of a visit to the Rural Home Economics Institute at Wageningen.

104. The planning of agricultural advisory work also entails an estimate of methods and means. For instance, the development of farm management involves the creation of mechanical computation centres[1] for analysing large numbers of enquiries and accounts and for the preparation of numerous farm index cards. Many other problems arise. Because of the intensifaction of advisory work and its developing role, advisory methods themselves must undergo modifications. The increased demand inevitably leads to the establishment, within the advisory systems, of "relay stations" or "dissemination centres", which show a growing tendency to rely on organised groups of farmers. Moreover, the creation of professional networks, or the association of farmers in one way or another with the preparation of programmes and the recruitment and supervision of advisers, represents, as we have already shown, a fundamental aspect of the development that is taking place in the pattern of advisory work in many European countries. This evolution is only one of the forms of the transition from "assistance" to "co-operation". In the economic democracies this transition inevitably occurs at a certain level of economic and social development.

105. There are several aspects to the co-ordination of agricultural advisory activities. There are problems of an internal character (e.g. co-ordinating the work of specialist and general advisers), and problems concerning the co-ordination of different services. Where by force of circumstances or because of the relative immobility of some services, the extension of advisory services is carried out by private initiative, this may result in a dissipation of action detrimental to efficiency.

In many cases the "development zones" can serve as an operational framework for co-ordinating action. Obviously the economic and social development of a region entails co-ordinated action in the different factors of this development. There seems to be little doubt that co-ordination in forecasting and programming will gradually become indispensable[2].

106. 4. Because of the rapid and profound changes taking place in the rural areas of many countries, the adaptation of advisory services to enable them to fulfil their functions calls for the organisation and development of suitable research.

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[1] Such centres already exist in the United Kingdom and elsewhere.

[2] Indeed this point of view seems to correspond with the recommendations of the Directors of Agriculture and Directors of Agricultural Advisory Services E.P.A./O.E.E.C. No. 36, pages 18 and 19.

We have already referred to the need for genuine research institutes specialising in the scientific study of intellectual investment in general. Scientific studies of farmers' attitudes towards technical progress, of the relative advantages and disadvantages of different advisory systems, of the real and potential market for advisory services, of the factors which restrict the extension of this market, and of the patterns and methods most likely to be accepted, and therefore to be the most efficacious, are still very rare in Europe.

At the second conference of directors of agriculture and directors of agricultural advisory services attention was drawn to the role of psycho-sociological studies in increasing the efficacy of advisory work.

In anticipation of co-ordinated action within the development zones, one of the aims of the sponsors of such action should be to select leaders. Studies and meetings on "methods of expression" and "human relations techniques" could be very useful for this purpose.

A comparison of the scientific work at present being performed on the international level in the field of advisory work would be also very useful[2].

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[1] Our attention has been drawn to the following works :

A. W. van den Ban : "Research in the Field of Advisory Work", Department of Rural Sociology, Agricultural University, Wageningen.

N. Westermarck : "Management and Success in Farming". Helsinki University.

French Ministry of Agriculture : "Etude du Marché de la Vulgarisation".

[2] One such confrontation concerning the work carried out in Europe and North America took place on the occasion of the Seminar on "Intellectual Investment in Agriculture" organised by O.E.C.D. (Annex II). Three reports on basic research in hand or foreseen to facilitate the spread of agricultural information were presented. By : Mr. A. J. Wichers (Netherlands) ; Dr. Albrecht (Germany) ; and Mr. Herbert F. Lionberger (United States).

Chapter V

OTHER FORMS OF INTELLECTUAL INVESTMENT

107. Agricultural research, education and advisory work can assume other forms than those already mentioned. Academies and foundations, agricultural societies, land reform and improvement bodies, regional development bodies, agricultural credit societies, co-operatives, young farmers' clubs, etc. undertake research, educational and information activities connected with particular interests, and contribute in various ways to intellectual investment. Action of this kind on the part of groups or firms reinforces the work of the general commercial and agricultural information systems already referred to. In order to encourage productivity and stimulate action, various bodies organise regional and national competitions (e.g. livestock judging contests, young farmers' cups, etc.) as well as international competitions such as the world ploughing championships.

In Italy the agrarian reform bodies, the land improvement syndicate, the development fund for the south, etc. play an important role in the settlement of new farmers, the development of irrigation, the introduction of new crops, etc.

Credit, which is the guiding lever of production, and more generally of the various forms of investment, can assume an educational character where the institutions concerned have economists and agricultural graduates at their disposal to assist farmers in planning their agricultural programmes and to advise them in executing these programmes.

108. At an early stage of their activities the Rochdale pioneers, who played a decisive part in establishing the "Charter of the Co-operative Movement", devoted a part of their surplus funds to co-operative education. Co-operative economy plays a decisive role nowadays in the processing and marketing of agricultural produce. In certain countries in some branches of production, chairmen, directors and managers of co-operatives assume increasing responsibility for the economic and social development of agriculture. For this reason, particular attention should be given to the training of co-operative officials and managers. Co-operative education and vocational training are consistent with the spirit of the co-operative

movement, and are rendered necessary by the responsibilities assumed by the latter.

Management schools, seminars, co-operative advice, etc., are more developed in some countries than in others. The O.E.C.D. could take the initiative in organising an international meeting on the purpose and methods of co-operative education and action.

109. Another basic form of intellectual investment is the young farmers' movements and clubs. There are many "4-H" type clubs in Europe (3-P in Italy, 4-K in Turkey, etc.). In the United States the 4-H clubs are educational organisations of a specialised type, which cater for rural youth and form part of the agricultural advisory system existing in all States[1]. Their organisation and activities are well known.

An important aspect of vocational training, and agricultural advisory work in relation to rural youth, is to assign responsibilities to the young people on a farm or to village teams, thus encouraging initiative as well as individual and group responsibilities.

110. The number of rural youth organisations has increased considerably in recent years. A list of them was recently compiled by UNESCO in collaboration with F.A.O.[2] These organisations are religious, vocational, trade union or political and, according to their character, they devote themselves to religious, moral, vocational or social education. Many of them are affiliated to the World Assembly of Youth.

According to M. FAURE[3], European youth movements were born of the psychological crisis bred by the contrasts existing between the traditional peasant society and the urban society which benefited from the advantages of a technicians' civilisation. The rural youth movements teach progress, show that one can be a farmer and "modern"; give young people an opportunity to complete their personal training, substitute more modern uses of leisure for traditional ones; propose forms of organisation in which it is the youth who makes the decisions; they also provide an escape from a "restrained environment" and prepare youth to assume the responsibilities which are their destiny. In France, the majority of those from rural areas who actually attain professional responsibility have been members of youth movements.

111. During the last few years, the activities of youth movements have developed. The training techniques have not played such an important part as in the past; time is devoted to economic, social and political activities, leisure and cultural activities take a more and more important place.

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[1] F.A.O. The 4-H Clubs in the United States of America.

[2] World list of rural youth organisations. UNESCO 1960.

[3] M. FAURE: The specific role of youth movements in the training and information of rural youth (Seminar, Annex II).

In the opinion of Mr. Piet Dijkstra, one of the most important facts established in a recent survey conducted by "World Rural Youth" was that :

> "...rural youth organisations in industrialised countries are tending to be more general in their outlook, and that in particular those rural youth organisations which have come into existence or started their work anew since the war, lay more stress on general education than on agricultural vocational training".
>
> "The changing pattern of rural life, caused by urbanisation and industrialisation, has influenced the programmes of rural youth organisations. General education and a more general pattern of work are now dominating in a number of organisations, particularly since 1945"[1].

The above statements confirm the already referred to desire of rural youth to acquire a general culture. It is also apparent that rural youth do not reject the civilisation born of industrial evolution, that they are trying to understand it and adapt it to their own needs and traditions. This opening to the "outside world" is a favourable factor for a better integration of the different social and vocational categories in the national community. Rural youth desires, like all other socio-professional classes, the benefits of the technicians' civilisation, and the most dynamic determinedly assume the responsibilities which the advancement of the rural milieu requires.

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[1] Piet Dijkstra, World Assembly of Youth : "Rural Youth Organisation and Vocational Training" (E.P.A. Project No. 8/16-B).

Chapter VI

ECONOMIC GROWTH AND INTELLECTUAL INVESTMENT IN TRAINING FOR OCCUPATIONAL CHANGES[1]

112. One of the basic conditions for economic expansion is that a skilled labour force, conforming to the requirements of such expansion, should be available[2].

From the point of view of employment, economic expansion necessitates:

a) *Vocational mobility,* which can be interpreted as a continual changing of employment (variation in the breakdown of the population by branch of activity and economic sector). Expansion is a process of change, which implies flexibility of training methods.

b) *Preparation for employment in new jobs.* There is a decreasing tendency for young people to follow in their parents' footsteps, and of all children now starting school at least one in four will do a job which does not yet exist.

c) *An increasing number of skilled jobs.* By 1975, the desirable breakdown of vocation skills in France will be as follows: 13-14 per cent highly skilled staff (university degree level); 18-19 per cent administrators and technicians (university entrance level); 48 per cent skilled workers (general or technical education certificate level); and 20 per cent unskilled workers. [according to Mr. J. FOURASTIE — Commissariat Général au Plan.]

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[1] This chapter was suggested by the proceedings of a seminar organised by O.E.C.D. on "Problems of Mobility of Agricultural Manpower in Relation to Economic Growth" [Document AGR/T(62)25]. Professor H. KRIER's statement on "The use of rural manpower in industry" was of considerable help to us. This talk was based on a larger publication "Rural manpower and industrial development", O.E.E.C., 1961 (120 pages).

[2] The dearth of skilled labour in Europe in 1962 has been cited to explain the recent slowing down of expansion. Experts of the European Economic Community note that there are certain manpower resources (especially in southern Italy and in France) but they have not the necessary skills: The problem is therefore one of "human investment". The E.E.C., which since 1960 has instituted a programme of accelerated vocational training for the Community, asks Member countries to make further efforts, resorting, if necessary, to the European Social Fund.

Section I: ECONOMIC GROWTH AND EDUCATIONAL GUIDANCE

113. The basic purpose of educational guidance is to help adjust offers and demands for employment by a comparison of tastes and aptitudes with the requirements of economic development. If a system of educational guidance is in operation it therefore implies the following.

a) The existence of employment forecasts for the population, and the expression of these forecasts in terms of educational requirements.

b) That the tastes and aptitudes of school children should be known, and that they should be informed of the probable "markets" for their aptitudes. (This raises the problem of *guidance methods* and *basic principles*: safeguarding the liberty of the family.)

c) That the programmes, the comparative number of the various types of scholastic establishments, and their location, is in accordance with family requirements, taking into account the aptitude and tastes of the children and the requirements of economic development. In concrete terms, the problem of guidance may be stated as follows: What sort of establishments must be constructed and where should they be situated? *The modification of employment prospects implies a modification of the educational structure and of the comparative stress given to the various types of training*[1].

114. An ideal system of guidance would make it possible to fill the jobs necessary to develop each branch of the economy, both qualitatively and quantitatively. This pre-supposes completely satisfactory methods of forecasting, and the adaptation of tastes and aptitudes to requirements, etc. In fact, our methods of forecasting and guidance are still far from satisfactory. Family liberty implies the right to re-orientation at any age, and, in any case, *"full employment in periods of economic growth is incompatible with stability of employment"* (J. FOURASTIE).

There may be a certain amount of disagreement with the guidance system as it actually works. Farmers frequently state that the selection process is a hindrance to them, and denounce the process of "skimming the cream off the rural population". But it appears that there is a contradiction in the desire to keep the best pupils in the farming profession, where working conditions, income levels and general way of life may be inferior to other walks of life, as can be noted in certain areas of Europe.

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[1] Guidance influences the organisation of teaching (it implies the same basic cycle for all pupils and excludes premature vocational training), and the educational structure, particularly in rural areas. It tends to replace scattered country schools with "inter-district" schools, which aim to obtain sufficient pupils (by use of such devices as co-education and school bus services) to justify specialised staff and a range of curricula to satisfy all requirements.

Section II : ECONOMIC GROWTH AND THE TRAINING OF RURAL LABOUR FOR INDUSTRY

115. "Mobility of agricultural manpower is a very important facet of the problem of general mobility of the total active population in the course of economic development"[1]. Economic growth implies, amongst other things a transfer of agricultural workers to other branches of activity. This transfer helps to reduce under-employment in agriculture and facilities the development of non-agricultural branches of industry producing goods and services for which demand increases more rapidly than for foodstuffs.

116. An analysis of trends in the active agricultural population over a period of twenty years (roughly the period 1930 to 1950) in seventeen European countries of the O.E.C.D. shows a decrease in 14 countries (it has increased in Greece, Spain and Turkey), whilst its proportion to total population has fallen in 16 countries (it has increased in Greece). The Committee for Agriculture of O.E.C.D. estimates that a reduction of the population actively engaged in farming in most Member countries is a necessary process if per capita incomes in agriculture are to be improved, and if a contribution is to be made to the growth of other sectors in expansion, which is needed if the growth target of 50 per cent over the next decade is to be attained[2]. *Hence the absolute necessity to train a certain number of farmers' sons for non-agricultural activities.*

117. An examination of the latest census figures for England and Wales shows that the drift from agriculture to other sectors of activity effects all age groups, but that the 15 to 24 age group is most effected. More recent information confirms this[3]. In France, those leaving the land are essentially young people. The decision to change is often taken on returning from military service, i.e. about the age of 22. Vocational changes are less common after the age of 35. Moreover, mobility is high among paid agricultural workers and farmers' sons but is low among the farmers themselves[4].

118. In the past farmers and their sons, "hounded by poverty" or attracted by higher wages, often transferred to other occupations without any prior training. Transfers from agriculture to other sectors are the major form of occupational change, and one of the basic conditions for economic growth. But in the past it was generally

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[1] O.E.C.D. Report on "Problems of Mobility of Agricultural Manpower in Relation to Economic Growth".

[2] O.E.C.D. Committee for Agriculture : Note on Agriculture and the growth target, 1962 (restricted). See also F.A.O.

[3] J. H. Smith, "Movement of Agricultural Population to Industry, Services and Other Occupations", in AGR/T(62)25.

[4] H. Krier, "The Use of Rural Manpower in Industry", in AGR/T(62)25.

the result of a "spontaneous reaction", and most often resulted in unfavourable conditions for the migrant farm workers.

The organisation of occupational transfers necessitates *preparation for a new kind of life and a new occupation.*

119. To the extent that it is true that agriculture is more a way of life than an economic activity, the transfer of the worker from agriculture to industry implies a complete sociological break. If such occupational transfers are to be "humane", not only must sufficient housing be available at the right time, but such housing should facilitate social adaptation of the newcomers. In a more general way, the arrival of new inhabitants necessitates the existence of shops, welfare services, places of entertainment, etc., which will facilitate integration into the new way of life.

120. In most European countries in the past, agricultural workers who left agriculture did not receive a sufficient basic training, and were neither prepared for their new occupation nor for their new way of life ; this still occurs in several countries.

This preparation must vary according to the age of the worker concerned. Where it concerns young people who decide to leave the land at the end of their primary schooling, for example, proper guidance should be provided, and they should be given training in accordance with their tastes, aptitudes and *probable future occupation.* In the case of those already engaged in farming who decide to leave the land, the problem is one of *vocational re-education* and *adult education.*

121. Generally speaking, primary education is of a less satisfactory standard in rural areas than in the towns. A high proportion of illiteracy still exists in the rural areas of certain countries, and in most countries available statistics reveal that primary education is less satisfactory in rural areas. "Under any policy to facilitate movement from agriculture to industry, the first task of public authorities should be to improve the conditions under which primary education is provided in rural areas. Incidentally this is also one of the prerequisites for improving the conditions of the population who stay in agriculture"[1].

122. The training of rural youth for industrial occupations can be facilitated by the establishment of technical schools in the neighbourhood. Generally, there is a tendency to localise technical schools in industrial areas. With a view to facilitating transfers of workers from agriculture to industry, it would appear to be desirable to locate some of these establishments in rural areas having a surplus agricultural population[2]. In certain countries establishments are set up especially for the rural youth who intend to go into industry. This

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[1] H. KRIER, Op. cit.

[2] This location gives rise to controversy — H. KRIER, op. cit.

is the case with the supplementary technical schools established in the agricultural districts of the Netherlands and of certain trade schools established in Sweden.

Basic vocational training should usually be supplemented by a specialised training given in the firm itself. When firms find they need to take on untrained staff they sometimes provide the necessary training, at times with financial help from the State.

123. The question of the vocational re-training of farmers is more complex. Such re-training may become necessary through various factors: the taking back of rented farms; farms which have become "economically non-viable" owing to technical progress and changes in markets, etc. The aim of a policy of reconversion or occupational change is: "to minimise the social upsets caused by the structural changes which accompany economic growth"[1].

In France, the supplementary law concerning agricultural orientation, dated 8th August 1962, establishes a "social activities fund for the improvement of agricultural structures" and provides, in particular, that this fund should foster the employment or re-employment of supernumerary farmers' sons and unemployed agricultural workers in other occupations, particularly those connected with agriculture, by granting allowances for vocational re-training.

These "reconversion" or "transfer" allowances are intended to facilitate the resettlement of agricultural workers and assist those who, in fleeing from rural proletarianism, are in danger of becoming sub-proletarians of the towns.

In some countries adult vocational training organisations have been set up to provide rapid, or accelerated, training for those over school-leaving age. Yugoslavia has made a remarkable effort in this direction. Both basic and advanced training are provided by means of evening courses, seminars, specialised schools and universities.

124. The purpose of this chapter is to briefly consider the basic aspects of training agricultural workers turning to other occupations. Another aspect might have been considered — that of transfers of agricultural workers from one region to another. It would appear that such migration raises problems of research and advice rather than of training proper.

Farmers and agricultural specialists cannot ignore the future of a large proportion of farmers' sons who, either from necessity or desire, will pursue a non-agriculutural occupation. Care should be taken that such transfer of employment (a *sine qua non* of economic growth) take place under humane conditions. More detailed studies may contribute to this objective; i.e. on the exodus from the land; systems of training both for the new occupation and the new way of life; drawing up forecasts regarding employment and training programmes; analysis of conditions in which rural workers are received in the cities; and so on. Nor should we neglect the transfers of workers into agriculture. These are very few where manual workers are concerned, but the number is much larger in the case of technicians and graduates, who must be prepared to understand the socio-economics of the rural environment.

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[1] H. Krier, op. cit.

Chapter VII

THE PLANNING OF INTELLECTUAL INVESTMENT

> *"...a nation to be fore-armed with education has to be forewarned; and this means, inescapably, taking long-term views, and taking broad views of future trends even if precise calculations cannot be made for the more distant future. Country after country gives instances of short-sighted economies or inadequacies which could have been avoided had adequate perspectives been taken in time... The meeting felt, therefore, that adequate long-term forecasts, taking into account many factors — economic, social and cultural as well as demographic — were an essential basis for any attempt intelligently to prepare a nation for the educational tasks that lie ahead..."*[1]

> *"Public interest in educational policies is steadily rising, and we think it should not be difficult to convince the public that there is as much need for a twenty-year programme of educational development as there is for similar programmes of railway modernisation or of atomic generation of electric power...*
>
> *...If there is to be a consistent programme of educational development, almost the first step should be to review the provision for statistics and research."*[2]

125. Under all economic systems, governments are assuming more and more responsibility for economic and social development. Some countries have elected to organise their development by means of plans. The socialist countries employ "integral planning". Countries with a western type of economy, such as France, have adopted "flexible planning". In these latter type of countries the plan tends to become an instrument for organising State intervention and the orientation of economic activity. In some cases the planning is of a partial type, dealing only with certain branches of activity (railways, electricity, etc.) or certain zones (regional planning).

Whichever, "economic road" is taken, all countries are assigning an increasingly important place to forecasting an estimation of their development prospects, and to drawing certain conclusions regarding action. In the preceding chapters, particularly Chapter *I*, the importance of providing forecasts, and planning intellectual investment with a view to overall economic and social development, has been demonstrated.

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[1] International Association of Universities: "Some Economic Aspects of Educational Development in Europe", pages 6 and 7.

[2] CROWTHER— A report of the Central Advisory Council for Education. London, page 473.

126. An examination of long-term economic trends over the past fifty years shows that whenever national income increases the proportion of total national resources devoted to education also increases. These resources may, however, be insufficient to meet both the educational desires of the individual (irrespective of background, geographical situation or income) and the needs of economic development for the training of personnel with the requisite cultural and vocational knowledge. In countries where the educational system is public, or is maintained by the public authorities, the number of pupils, their orientation and social and geographical origin largely depend on decisions taken by public authorities concerning the juridical and institutional organisation of education, and on their decisions regarding the distribution of available resources amongst the various branches of activity and categories of consumption. The decisions of the public authorities should be based on appropriate numerical data : studies and forecasts.

127. The methodology of educational planning[1] has been dealt with in several works in recent years, including a number of basic documents. The International Association of Universities[2], the Directorate for Scientific Affairs of the O.E.C.D.[3], the International Bureau of Education (Geneva) and UNESCO[4], have all made important contributions to the available knowledge on educational plans and to progress in methods. The O.E.C.D. Directorate for Scientific Affairs held a training course at Frascati, Italy, from the 3rd to 28th September, 1962, on educational planning for economic and social development, which was designed to train experts in the policy of investment in human resources.

A knowledge of the basic documents dealing with the overall planning of education is essential for all those concerned with the promotion and development of agricultural education and for the integration of agriculture into the general plan. The promotion of equity amongst the different social and vocational categories should be constantly kept in mind.

In the present chapter we consider some basic aspects of :

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[1] For convenience the term "educational planning" is employed to denote work relating to forecasting and planning in the strict sense.

[2] Some Economic Aspects of Educational Development in Europe ; Paris, 1961.

[3] O.E.C.D. : The Policy of Economic Growth and Investment in Education, Washington Conference. 16-20 October 1961. Five Sections.

[4] UNESCO : Educational Planning. 1962.

(*I*) overall planning of education; (*II*) problems specific to the planning of agricultural education; and (*III*) concrete expression in the form of an example supported by figures.

Section I. BASIC ASPECTS OF THE OVERALL PLANNING OF EDUCATION

128. There are many arguments to justify the planning of education, notably:

a) The time required to train skilled labour, technicians and higher administrative personnel; which necessitates a forecast of needs in relation to economic growth, an estimate of the credits necessary, the orientation of educational investment and a recruitment and training programme for teachers.

b) The increasingly high cost of education as mass education develops, the educational service tends to become the most important of the public services, and educational costs become the largest item in the budget and an important item in national accounts.

129. Once the principle of planning is accepted, educational planning institutes vary according to country. The planning of education is facilitated by the existence of a centre for overall planning and sufficiently centralised administration. In countries with a federal type structure, and in those where the initiative for education and vocational training is shared by several Ministries, or where powers are very decentralised, machinery for the centralisation of information and for comparing and integrating educational projects appears to be necessary.

In Germany, where the educational system is very decentralised, forecasting and orientation are ensured by means of *ad hoc* commissions. In England and Wales, where the administration of education is traditionally very decentralised, the Ministry of Education is, nevertheless, responsible for general orientation. The Netherlands and Sweden both have permanent forecasting and planning bodies[1]. In France, educational planning is carried out, within the "Commissariat Général du Plan", by the "Commission de l'Equipement Scolaire et Universitaire"[2].

In conjunction with the O.E.C.D., the Mediterranean countries (Greece, Italy, Portugal, Spain, Turkey and Yugoslavia) have organised national teams to plan education within their perspectives for economic development[3].

It must be said that the planning of agricultural education and agricultural vocational training is not always properly integrated within overall educational plans. Although agricultural education raises special problems that call for the aid of experts, problems of training youth should be subjected to an overall examination. Agricultural education is too often still treated as a subject apart, and plans for the development of agricultural education are not sufficiently integrated into the overall planning of education.

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[1] O.E.C.D. Targets for Education in Europe in 1970. From publication of Mr. Ingvar SVENNILSON and his colleagues, pages 53 et seq.

[2] O.E.C.D. The Planning of Education in Relation to Economic Growth. Pages 9 to 32.

[3] O.E.C.D. Mediterranean Regional Project.

130. In the perspectives of overall economic development, let us consider the basic relationship:

$$I = C + E + IN \qquad \text{(see Introductory Chapter)}$$

The portion of the national income to be allotted to education, considered as an investment, may be expressed schematically in the following terms:

Assuming that a country saves and invests 20 per cent of its income in the form of physical capital (IN), and spends 3 per cent of it on education (E), that is to say, a total investment rate of 23 per cent, should (for example):

a) the overall rate of investment be raised to 24 per cent and consumption be reduced by 1 per cent)?

b) The additional saving be assigned to education or to physical capital?

To answer the latter question, it would be necessary to measure and compare the marginal productivity of an increase of 1/20, i.e. 5 per cent, in physical capital, and 1/3, i.e. 33 percent, in intellectual capital[1]. We have already referred to the difficulties involved in such estimates.

131. A more practicable approach is to estimate the evolution of employment according to sector or branch of activity, having regard to the desirable or probable evolution of the gross national product and of labour productivity; to determine the posts to be filled and the corresponding types of training with the aid of a more or less complicated "correlation" table (the table employed in France by the Commissariat Général du Plan is given here). In theory, this method makes it possible to adjust the orientation of education to the needs of economic development and, by employing appropriate formulae, to estimate the evolution in costs of education.

132. Even assuming that the preceding calculations can be correctly made, the conclusions to be derived from them would, however, constitute only *elements* to be taken into consideration, for education is not exclusively an investment. A school has human, democratic aims which are largely distinct from strictly economic needs. One might be led to forecast the evolution of school attendan-

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[1] This example is borrowed from I. Svennilson: Targets for Education in Europe in 1970, page 47 et seq. The percentages correspond to those of western European countries.

AVERAGE RELATIONSHIPS BETWEEN EMPLOYMENT AND EDUCATION[1]

LEVEL	EMPLOYMENT	EDUCATION (HUMANITIES AND PHYSICAL SCIENCE)	NUMBER OF YEARS OF EDUCATION AFTER THE END OF THE „CYCLE D'OBSERVATION" (2)
1	Highly responsible and complex management functions, heads of departments, technologists and teachers requiring very thorough knowledge of vast and difficult fields	At least one year after the "licence d'enseignement complète"	At least 10
2	Functions requiring a sounds knowledge of difficult fields	University degree or diploma in technology	At least 9
3	Technicians and administrators performing functions requiring knowledge in relatively limited fields	Two years, or at least one year after baccalauréat or diplôme de technicien	6, or more generally 7
4	Supervisors (foremen) and assimilated	Baccalauréat or diplôme de technicien level	On average 5
5	Skilled workers (manual and clerical)	"Certificat professionnel" level	3 to 4
6	Unskilled workers		1 year (or 3 years) [3]

1. Table employed by the Commissariat Général du Plan (France). There is no "rigid link between diploma and employment" (except for certain professions) and therefore the Commission de l'Equipement Scolaire and the Manpower Committee of the Commissariat Général du plan have drawn up a table of "very broad relationships".
2. After age 13 on average, i.e. after the 7th year of school.
3. 3 years when the school-leaving age is raised to 16.

Source : M. POIGNANT : The Planning of Education in Relation to Economic Growth. O.E.C.D., page 20.

ces, having regard to juridical factors (level of school attendance, obligation, etc.), demographic factors (birthrate), social factors (aspirations to education, democratisation of education, etc.), and economic factors (evolution in family's purchasing power and in State resources) and to distribute pupils to the best advantage amongst the specialised branches of education, having regard to probable vocational outlets[1]. It is then possible to deduce for each type of instruction the requirement in teachers, the number and siting of schools, the amount of investment and the cost of education ; to ascertain the obstacles that hinder educational development and to propose a set of measures to deal with them ; to employ family information media and student guidance and re-adaptation methods.

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[1] O.E.C.D. The planning of education in relation to economic growth. — France (M. POIGNANT) page 9 et seq.

TABLE VI. EDUCATIONAL TARGETS IN EUROPEAN COUNTRIES FOR 1970[1] MINIMAL HYPOTHESIS

ZONE	SCHOOL ATTENDANCE						CURRENT EXPENDITURE FROM ALL SOURCES AS PERCENTAGE OF THE G.N.P. (IN 1970)
	5 TO 14 YEARS		15 - 19		20 - 24		
	BASE YEAR 2	1970	BASE YEAR	1970	BASE YEAR	1970	
Northern countries [3]	94.0	94.6	20.6	30.0	5.0	6.7	3.4
France - Benelux	89.7	90.6	31.3	39.0	4.2	5.1	3.1
Austria, Germany, Switzerland	80.6	82.9	17.4	24.3	4.4	6.1	2.2
Mediterranean countries [4] ..	66.0	67.6	12.3	18.6	3.1	3.4	2.6
O.E.E.C. Zone	78.5	79.2	17.6	25.5	3.8	4.8	2.8
Canada and United States ..	89.7	89.8	64.3	68.1	11.7	12.7	3.8
U.S.S.R.[5]	71.5	75	48.6	50	8.2	10	4.2

1. Taken from the publication of Mr. Ingvar SVENNILSON and his colleagues, (page 87 et seq.).
2. 1958 or the nearest year.
3. Denmark, Iceland, Ireland, Norway, Sweden, United Kingdom.
4. Greece, Italy, Portugal, Spain, Turkey, Yugoslavia.
5. Including evening and correspondence courses which, to an even greater extent than in other countries, constitute an essential part of the education system and provide preparation for the same examinations as full-time instruction.

TABLE VII[1]

ZONE	SCHOOL ATTENDANCE			EXPENDITURE AS A PERCENTAGE OF G.N.P.	
	5 TO 14	15 TO 19	20 TO 24	CURRENT	TOTAL
Northern countries	95.0	34.6	7.5	3.8	
France-Benelux	91.7	46.3	7.1	3.7	
Austria, Germany (Federal Republic), Switzerland..	84.9	30.0	7.2	2.8	
Mediterranean countries ..	75.0	24.1	4.8	3.2	
O.E.E.C. Zone	83.3	31.2	6.1	4.4	4.04
Canada and United States	89.8	73.1	15.6	4.4	5
U.S.S.R.	80.0	60.0	12.0	5.0	5.97

1. See comments accompanying Table VI.

133. Mr. Ingvar SVENNILSON and his colleagues[1] have established the prospects for educational development in Europe until 1970 by employing a "minimal hypothesis", which assumes that the amount spent will be the same as in the past, and a "maximal hypothesis", representing the progress to be expected by spending the greatest amount reasonably possible. We have thought it desirable to reproduce some basic data regarding these prospects. Table VI refers to the minimal hypothesis, Table VII to the maximal. For a more detailed analysis of this data and its significance, the reader is referred to the original publication. A knowledge of the global prospects for educational development is essential for agricultural education specialists, particularly to evaluate the relative evolution in the amounts to be spent and to draw conclusions on future action.

Section II. EDUCATIONAL PLANNING AND AGRICULTURAL VOCATIONAL TRAINING

134. The statements in Section *I* of this Chapter, on the necessity and methods of educational planning in general, apply equally to the agricultural sector. We must again emphasise the need to include agricultural education specialists in teams for global educational planning; or alternatively to create close liaison between the "global" committees and the agricultural ones.

It should be pointed out that:

a) Plans for intellectual investment in agriculture should be prepared in conjunction (where they exist) with the:

- — general development plan which provides, *inter alia*, for the evolution of employment according to branch of activity;
- — plans for the development of the agricultural sector which forecast the orientation of production, production patterns (viable farms), etc.;
- — global plans for intellectual investment, with a view to harmonising the various categories of investment of this type.

b) Regional plans for intellectual investment in agriculture can be prepared, but they should take account of:

- — national prospects;
- — the conditions specific to the region concerned, which have particular significance in the regional location of establishments necessary to satisfy national needs.

c) Since they are inter-dependent, the different forms of intellectual investment in agriculture should be considered as a whole. Their relative size depends on the system of investment selected, having regard to the level of economic and social development. For example, countries which have attained a high level of development will be inclined to spend relatively more on research and less on education and information. Other countries will be inclined to give priority to education or information. In France, priority should probably at present be given to agricultural education.

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[1] O.E.C.D. Targets for Education in Europe in 1970, pages 45 to 97.

From the point of view of planning, each of these forms of investment raises specific problems. In the remainder of this report we deal exclusively with plans for agricultural education.

135. Agricultural education aims to train farmers, family labour and hired agricultural labour; and the technicians, middle and higher grades of staff required by public authorities, farmers' organisations and other professions. The various forms of education can be grouped into two main categories — agricultural education up to university level and university-level agricultural education. These two categories are (or to an increasing degree will be) inter-dependent, and should therefore be considered together. From the point of view of planning methods, however, each poses specific problems. Only the planning of agricultural education up to university level will be dealt with here.

Such planning is necessarily governed by conditions specific to each country: e.g. general objectives of economic and social policy; the level of economic development and prospects of evolution; legislation affecting agricultural training and reforms in progress or projected, etc. The aim is merely to examine the methodological bases capable of guiding action and, by way of illustration, to describe a concrete example of planning.

I. STATISTICS AND NORMS REQUIRFD FOR PLANNING

136. The preparation of a plan for developing agricultural training implies the availability, or requires the collection of, demographic employment and educational statistics: information on the number of public, private or semi-private establishments according to category, number of teachers, of pupils, of diplomas issued according to sex, stage and category of education, etc.

The preparation of a plan also calls for the establishment of norms for each educational stage and category; e.g. time available for education, number of pupils per class (or elementary unit of education), number of specialist teachers per class, annual cost per pupil, etc. The norms may be drawn from experience (ratio), but to allow for probable evolution they should rather be based on models. The establishment of optimal norms is based on research into the pedagogically most satisfactory system which, economically speaking, is the least expensive. The establishment of such norms obviously entails comparative research into the relative efficacy of different educational methods, and calculation of the number of educational units necessary to ensure full employment of the teachers (whose salaires constitute the biggest item of expenditure on education[1]), where necessary by the combination of education with various forms of advisory work or adult education, etc. From the economist's point of view, systems of education are distinguished by variable combinations of work and capital per unit trained, and by the cost of training this unit. It is not possible to discuss the list and methods of determining norms. We have shown in Table VIII the norms employed for our calculations under Section *III*.

During recent years farm management studies have met with great success in Europe, many meetings have been organised by the O.E.E.C. and a catalogue of "norms" has been prepared. Educational and advisory services have made a considerable contribution to the dissemination of information on modern management techniques, but it is no exaggeration to say that the methodical study of the economics of agricultural education has scarcely begun in Europe.

Most branches of production and sectors of activity devote some of their resources to develop research and improve its efficacy, but as far as education is concerned we are not yet devoting, say, even 0.5 per cent of the total resources of the sector to study and research aimed to increase its efficacy.

II. FORECASTS OF THE AGRICULTURAL POPULATION TO BE TRAINED

137. In view of the length of training (e.g. an agricultural pupil needs about 3 years to achieve a short secondary training, 5 years for a terminal long secondary training, 10 to 12 years to obtain a university degree), the forecast period should be between 5 to 10 years. As far as possible, therefore, all forecasts relating to agricultural training should refer to a period of this duration.

138. The global calculation of the agricultural population to be trained necessitates:

a) *Demographic forecasts.* — satisfactory global population statistics are available in most countries, but it is sometimes difficult to obtain statistics according to age and sex, to establish the age pyramid relating solely to the agricultural population, and to ascertain the number of children of the farming community who will attain school age during the coming years.

b) *Forecasts relating to the evolution of the active agricultural population*[2] — several methods may be employed or, to be more correct, combined, in order to obtain increasingly satisfactory approximations:

i) Projection into the future of active agricultural population trends observed in the past;

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[1] According to Professor EDDING they often constitute 60 per cent of the total expenditure.

[2] O.E.C.D. — Directorate for Agriculture and Food. "Problems of mobility of agricultural manpower in relation to economic growth", Paris 1962.

ii) Population forecasts modified by a rate of exodus from the land assumed to be the same as in the past;

iii) Population forecasts modified by a rate of probable exodus arising from, *inter alia*:

- the manpower needs in other sectors of activity, having regard to the objectives of overall plans;
- changes in farming systems;
- desirable agricultural population, taking account of the gross agricultural product and of the productivity of agricultural labour;
- the achievement of a parity income for farmers;
- changes in the outlook and habits of those engaged in farming and their children.

It is sometimes necessary, when estimating the evolution of the active agricultural population, to proceed by reference to social-professional categories (farmers, members of their family, hired labour, etc.).

c) An estimation of the annual quota (Aq) of young people to be trained to ensure the renewal of the probable active agricultural population (Ap). This estimate (often with sufficient accuracy) can be made by dividing the probable population by the average duration of activity (Ad):

$$Aq = \frac{Ap}{Ad}$$

III. FORECASTS RELATING TO THE TYPE OF TRAINING AND RATE OF SCHOOL ATTENDANCE

139. *a*) The difference between the annual contingent of farmers' and farm workers' children, and of children necessary to renew the probable agricultural population, makes it possible to calculate the surplus agricultural population (or shortage, as the case may be) which should receive training other than in agriculture (e.g. general or technical). To the annual number of future farmers and farm workers to be given an agricultural training, however, should be added the annual number of middle and higher grade agricultural technicians drawn from the agricultural population.

b) Forecasts of "types of training" are based on existing legislation as well as on projected or probable reforms.

c) Forecasts of attendance rates (percentage of children of school age who will actually receive an agricultural training at different levels) are more difficult to establish. They may be based on a continuation of past trends or on comparisons, e.g.:

- school attendace rates in urban areas (parity hypothesis);
- agricultural school attendance rates in the most developed agricultural areas;

- school attendance rates in other countries (e.g. within the European Economic Community there is a tendency to refer to the most advanced country).

Reference may also be made to the "talent limit", but very few systems of agricultural training exhaust the intellectual capacities of the farming community.

The plan may set fixed targets, having regard to the financial effort that a region or country is prepared to make, the existing situation, the comparisons made, the importance attached to intellectual investment, the social aspirations of farmers, etc.

IV. FORECASTS RELATING TO MEANS TO BE EMPLOYED

140. From the training targets adopted for future years and the norms related to the systems of education chosen, the required number of teachers, requirements in premises and equipment, operational costs, etc., can be deduced. The norms adopted should allow for changes in the educational system resulting from an increase in the number of pupils. As Professor EDDING says, it is a big mistake to assume that only the number of pupils will change and that otherwise the system will remain constant.

The investment required in teachers and material resources can be determined by comparing the means required in the future with those at present available.

The number of teachers depends on the educational system selected (specialist teachers, combination of full and part-time teachers, number of pupils per class, teaching methods, etc.).

When considering educational development prospects the amount of invested capital (accommodation and equipment) per available place is calculated, rather than the amount invested per pupil present, since, during a certain period, only a part of the training capacity of an establishment may be used. The same may apply in regard to other items of expenditure, e.g. salaries of teaching staff.

The total cost per pupil comprises amortisation and other charges on invested capital, costs of instruction (salaries of staff) and expenditure relating directly to the pupil (food, clothing, health, books, etc., which in most cases are borne directly by the latter).

Investments and operational costs arising from the execution of the investment plan are borne by the State and public bodies, private funds and families in proportions which vary according to national custom and policy.

V. SPECIFIC MEASURES TO FACILITATE THE EXECUTION OF THE PLAN

141. The establishment of a development plan for agricultural training is an excellent means of ascertaining real needs and calculating the effort involved. Thus, it has rightly been said that the forecast is in itself creative. Getting acceptance and desirable execution of a

plan may involve numerous difficulties — limiting factors or bottlenecks which must be located and dealt with by suitable means. These limiting factors may be: lack of resources; lack of receptivity on the part of those engaged in farming; excessively high educational costs; an inadequate system of scholarships; etc. In Europe, the principal bottleneck in the next few years, due to lack of forecasts, will probably be a shortage of qualified teachers. It is evident that the absence of forecasts can cause a decline in the quality of education, and that the absence of appropriate measures can cause a shortage of the highly qualified manpower represented by teaching staff. Women will probably play an ever increasing role in education in the years to come.

VI. THE REGIONALIZATION OF ACTION

142. A national plan for the development of agricultural training should always be adapted to the specific conditions of regional economies. Specific regional conditions will influence such things as the location and distribution of schools.

The surplus agricultural population is a factor favouring the provision of general or technical schools and vocational reguidance centres. Certain regions might be given priority in order to reduce disparities resulting from traditional circumstances, etc.

143. Many other problems should be tackled in connection with the planning of agricultural training: e.g. liaison with advisory services and youth movements; adult education centres; etc.

Our aim is to make the importance of planning better recognised, and to apply general methods of planning to intellectual investment in agriculture. These proposals are submitted for discussion. They will have to be considered, clarified, and extended to all intellectual investment — research, education and advice.

Section III. A CONCRETE EXAMPLE: THE DEVELOPMENT PLAN FOR AGRICULTURAL EDUCATION IN A FRENCH "PROGRAMMING" REGION: BRITTANY[1]

144. For planning purposes, France has been divided into 21 "programming" regions, of which Brittany is one. We give below a summary of the principles, hypotheses and basic calculations which serve as a background for the preparation of the regional plan for agricultural education. The norms employed in relation to the educa-

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[1] This study has been commented on by M. DEHEYN of the O.E.C.D. Directorate for Scientific Affairs, for whose constructive observations we are deeply grateful.

TABLE VIII.[1] NORMS USED IN THE PREPARATION OF THE REGIONAL DEVELOPMENT PLAN FOR AGRICULTURAL TRAINING IN THE "PROGRAMMING" REGION OF BRITTANY

1. NUMBER OF PUPILS PER CLASS AT THE HIGH SCHOOLS = (Average norm of 30 implying a greater number of pupils at the start of classes, taking account of a "fall-off" coefficient to be estimated)	30
2. NUMBER OF SPECIALIST TEACHERS PER CLASS AT THE HIGH SCHOOLS (crop husbandry, animal husbandry, humanities, physics, mechanics and "génie rural"; chemistry, biology, physical training, mathematics, French)	9
3. NUMBER OF "TEACHING UNITS" PER CLASS AT THE HIGH SCHOOLS in relation to: *a*) pedagogic needs (number of specialist teachers) *b*) teaching formulae to enable full employment of the teaching staff (excluding holiday courses) .... [High schools with 10 classes and 300 pupils.]	1.6
4. Number of specialist teachers per class in colleges	4.8
5. Number of teaching units per class in colleges. [College with 6 classes and 180 pupils]	1.4
6. Amount of investment per place (building and basic equipment)	20,000 F.

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[1] The norms shown in this table are given by way of *illustration of a method*. They are determined by taking account of the national structures of agricultural training, the size of the high schools, specialisations, and the number of hours of instruction required of teachers, etc.

TABLE IX. FORECASTS OF THE MALE AGRICULTURAL POPULATION TO BE TRAINED

a) According to population forecasts, the *annual average* number of farmers' and farm workers' sons to attain the age of 14 during the period 1960-1970 will be approximately	8,100
b) Assuming continuance of past trends in the active male agricultural population; taking account of population forecasts modified by a probable rate of exodus from the land; of proposed re-grouping of farms to create viable units; etc.; it is estimated that the active male agricultural population will be approximately	220,000
c) Assuming the average duration of active life to be 40 years; the annual average size of the male population to be replaced (and trained) would be 220,000/40, i.e. .... (It is not necessary to divide this population into farmers, family labour and hired labour. In fact, the number of hired workers shows a constant tendency to diminish, and most of the family labour are destined to become employers at some stage of their life — father-son farms.)	5,500

TABLE X. FORECASTS OF TYPES OF TRAINING AND RATES OF SCHOOL ATTENDANCE

a) To the annual male agricultural population to be trained must be added the agricultural contribution to the training of medium grades (agricultural technicians) and higher grades (graduates). This has been estimated at about one hundred, i.e. *an annual male quota to be trained of approximately*		5,600
It follows from the above forecasts that the number of male children of those engaged in farming to be given "general" or "technical" instruction each year would be at least 8,100 — 5,600 =		2,500
b) Our calculations deal only with two basic types of training (agricultural colleges: 13 to 16 years; agricultural high schools: 13 to 18 years). These are referred to in the right hand columns below:		
c) SCHOOL ATTENDANCE RATES (in 1970)	Colleges 13—16 years	High Schools 13—18 years
Assuming parity with urban areas (at Rennes 31 per cent of the children attend school until the age of 18 years); i.e. an annual male agricultural quota of		1,700
Assuming parity with the Netherlands		
85 per cent at the 1st stage	*4,675*	
35 per cent at the 2nd stage		*1,925*
A reasonable assumption, having regard to existing legislation and to the prevailing situation in the programming region:		
— 100 per cent until the age of 16 years, (compulsory school attendance)		
— 40 per cent of whom will receive vocational training together with a high standard of general education.		
30 per cent in the colleges	1,650	
10 per cent in the high schools		550
d) Annual requirements to replace and increase the number of male agricultural technicians and to allow for migration for access to university education		100
e) Number of males to qualify annually (reasonable assumption)	*1,650*	*650*
f) Number of females		
Assuming parity	1,650	550
Technicians and for access to university education		40
Total	**1,650**	**590**
g) Male and female quotas to qualify each year in agricultural colleges and high schools	**3,300**	**1,240**
Number of males included therein	*1,650*	*650*

tional system adopted are shown in Table VIII. They need to be subjected to comment and discussion, but this is not considered necessary for the present purpose, namely, to illustrate a planning method. It should also be pointed out that French legislation now in force provides for compulsory school attendance up to the age of

TABLE XI. FORECASTS OF MEANS TO BE EMPLOYED
[For training males. Calculated by reference to the numbers to be trained and the norms shown in Table VIII]

	Colleges 13-16 years	High Schools 13-18 years
a) TOTAL NUMBER OF PUPILS		
— Desirable number of diplomas	1,650	650
— Total number of pupils, assuming an average fall off of about 5 per cent per year:		
age: 17-18 years		682
16-17 years		716
15-16 years	1,732	752
14-15 years	1,819	790
13-14 years	1,910	829
Total	5,461	3,769
b) TOTAL NUMBER OF CLASSES (number of males divided by average of 30)	180	126
c) NUMBER OF TEACHERS REQUIRED		
— in the colleges (1.4 unit per class)	225	
— in the high schools (1.6 unit per class)		202
d) NUMBER OF ESTABLISHMENTS		
— assuming a college with two final-year classes (i.e. a total of 6 classes)	30	
— assuming a high school with two final-year classes (i.e. a total of 10 classes)		13

16 as from 1970. In theory, primary instruction stops at the age of 13 years (after the "observation phase" from 11 to 13), and is followed by "general", "technical" or "agricultural" training. As far as agricultural training is concerned, the legislation provides for two types of establishment which combine general education and vocational training : colleges (short-term secondary agricultural training for boys of 13 to 16 years) and high schools (long-term secondary agricultural training for those of 13 to 18 years). Rural youths who do not attend either type of establishment complete their compulsory school attendance (until the age of 16) by following some other kind of training course.

Existing legislation also lays down that women shall have access to a level of training similar to that of men. When applying the forecasting programme proposed under Section *II* of this Chapter, only the male population is dealt with in the first place, and then the agricultural population as a whole, and the targets for 1970 are determined.

145. Account beging taken of the present number of establishments, provision would have to be made for the creation within the next few years of about 8 high schools (each with 350 pupils) and 20

colleges (each with 200 pupils). This represents an investment of approximately F 136,000,000. The application of the principle of "equal training for women" would entail doubling this figure, except where the development of mixed or twin establishments permits better use of staff and a reduction of costs per pupil. On the other hand, the expenditure envisaged relates to the training at the short-term secondary stage of only 30 per cent, and at the long-term secondary stage of only 10 per cent, of these who will take up farming.

The school attendance of all those who will be engaged in farming up to the age of 16 ; of 10 per cent at the high school level ; and of an indefinite number at post-first-stage vocational courses ; would suggest an investment in the region of F 200-300,000,000.

This figure may seem high. Nevertheless, a comparison of this "intellectual investment" with the total investment envisaged for the modernisation of agriculture in the programming region shows that it represents only about 5 per cent of the total. For the period under consideration it is equivalent to about 100-130 F per hectare of utilised land and F 2,000 per farm.

It seems that investment on this scale are feasible if the will to effect them exists. But the principal limiting factor appears to be the shortage of teachers. Therefore, unless immediate steps are taken to remedy this state of affairs, the development of agricultural education will be seriously jeopardised.

146. It is regrettable that we are unable at present to fix the objectives of agricultural education in Europe, and to prepare a document for the agricultural sector similar to that prepared by Mr. Ingvar **Svennilson** and his colleagues. Such a document would be very valuable ; it would enable agricultural education to be placed in perspective in relation to general education, and above all it would make it possible to estimate and compare the efforts required in Member countries. *It could thus serve as the basis for a policy of technical co-operation amongst Member countries.*

It is highly desirable that the work begun by the Directorate of Scientific Affairs be pursued in liaison with the Directorate for Agriculture and Food ; it could lead to a general development programme for education in Europe in which agriculture would be included.

Chapter VIII

CO-ORDINATION OF ACTION

147. Each form of intellectual investment — research, education, advisory work and others — must meet specific needs related to economic growth and development. The basic lines of action may be summarised as follows:

a) Organise and expand "research development", the object of which is to ensure technical progress, identify obstacles to economic and social development, and propose means and methods of reducing them.

b) Integrate and develop agricultural education within the general educational structure in order to reduce the disparities existing in many countries, especially in regard to the level of training of "heads of enterprises" in the various social-professional sectors.

c) Intensify, expand and co-ordinate information services in order to provide all the information needs of farmers. To replace the traditional technical type of advisory service by a socio-economic one better adapted to the needs of farmers in developed countries.

d) Prepare young people for their future responsibilities.

148. The various forms of intellectual investment are interdependent. An examination of the formula:

$$Ai = R + E + A + Of$$

suggests many relationships between research and university education, between agricultural education and advisory work, between advisory work and youth movements, etc. Intellectual investment constitute an ensemble of costly means; mainly in the form of highly qualified workers. Hence the need to ensure full and efficient employment of the means available, particularly in adapting the growth and structure of intellectual investment to the requirements of overall economic development and social equity. This poses such problems as: the distribution of those to be trained and the means available between the various types and stages of education; distribution between the different categories of intellectual investment; the siting of teaching establishments, etc. Research is not sufficiently advanced to enable us to establish any type of "model" of the overall development of intellectual investment in agriculture. It is desirable that such research should be undertaken so as to furnish a methodological basis for action in this field.

In the present chapter we restrict ourselves to considering some of the basic aspects of co-ordination in forecasting and action : a fundamental condition for the balanced development of intellectual investment, for its economic efficacy and for social equity.

Section I. FUNDAMENTAL FORMS OF CO-ORDINATION

149. The first fundamental requirement of co-ordination concerns the "integration" of agricultural forecasts, projects or plans into overall forecasts, projects or plans. In other words, the co-ordination of :

a) overall development and the development of the agricultural economy from which follows, *inter alia*, the forecast of employment outlets during the coming years and, consequently, the objectives of education ;
b) development of scientific research and agronomic research ;
c) development of the different types and stages of education ;
d) rural development within general improvement schemes, and notably assessment of the school attendance trends for the various categories of teaching establishment.

150. The second basic form of co-ordination relates to the integration of intellectual investment within the general plan for agricultural investment. This makes it possible to estimate the portion devoted to human training and information compared with that devoted to material investment, such as land consolidation, provision of roads, village improvement schemes, etc.

Such comparisons are often enlightening, and in most cases furnish arguments for the intensification of intellectual investment, which is too frequently neglected in plans and projects.

151. The third basic form of co-ordination relates to agricultural intellectual investment as a whole.

The conference of directors of vocational agricultural training in Europe and North America concluded that co-ordination is often far from satisfactory between : agricultural training and employment and educational guidance forecasting bodies ; 1st and 2nd stage agricultural training and university education ; education and other kinds of intellectual investment. The Conference noted the disadvantages resulting in some countries from excessive decentralisation, and from the lack of uniformity in the distribution of responsibilities amongst public authorities. In some countries the essential role is played by the Ministry of Agriculture on whom falls the exclusive or main responsibility[1].

The conference of directors for agriculture and directors of agricultural advisory services in Europe and North America also considered the question of "co-operation with other services and organisations" : vocational training ; higher education and research ; rural home economics ; agricultural credit services ; professional agricultural organisations and co-operatives ; rural youth organisations ; etc.[2].

152. The main problems of liaison and co-ordination of intellectual investment might be summarised as follows :

a) liaison between "university" research and agronomic research;
b) co-ordination of the different stages and types of agricultural education (agricultural education should be an "ascending" whole integrated into the general pattern of education) ;
c) co-ordination of the various forms of agricultural advisory action — technical, work study, farm management, marketing, rural home economics, land improvement, etc. ;
d) co-ordination of the various forms of intellectual investment in agriculture (liaisons : research — education — advisory work) ;
e) liaison between public authorities and professional bodies[3].
f) liaison between the educational and information bodies and certain groups which play a major role in the development of the agricultural economy, such as co-operatives, credit, organisations, young farmers' clubs.

153. The existing institutions in Member countries differ considerably in their immediate aims, size, methods and in the co-ordination of their respective methods. These differences are due far more to traditional and cultural reasons, social ideas, and political trends than to technical factors.

International co-operation between specialists is gradually leading to the emergence of a doctrine of aims, means, and priorities in the field of intellectual investment, but this doctrine will subsequently have to be adapted to meet particular national requirements. The organisation of the "Land Grant Colleges" in the United States is a good example of the co-ordination of intellectual investment in agriculture.

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[1] O.E.C.D. Agricultural Vocational Training in Europe and North America, Documentation in Food and Agriculture, No. 52.

[2] E.P.A./O.E.E.C. Food and Agriculture Documentation Series : No. 36, pages 45 to 53.

[3] The Conference of Directors expressed satisfaction at the increasingly general tendency to associate farmers' organisations with the preparation and execution of educational and advisory policies.

Since, in most countries, the distribution of responsibilities amongst public authorities is determined by traditional and political rather than by technical considerations, the problem of ensuring efficacious action in intellectual investment can be solved by forming co-ordinating committees.

Section II

CO-ORDINATION AND THE "MARCH OF PROGRESS"

154. The different aspects of co-ordinating intellectual investment also arise with the conveyance of discoveries from the laboratory to practical application. The progress of a discovery implies invention, experiment, demonstration, practical acceptance by "advanced" farmers, and gradual dissemination amongst all farmers.

The discovery of a new variety of crop, of a new method of plant cultivation or animal husbandry, of a new product for combating animal or plant diseases or pests must be tested and, where necessary, adapted to meet variations in local agricultural conditions (climatic and soil variations, variations in available resources, production patterns, etc.). This testing and adaptation comes more especially within the field of agricultural experiment.

To secure the farmer's acceptance of a discovery, its value must be demonstrated. This demonstration has both an economic and technical basis (demonstration area). As the employment of economic calculations in agriculture develops, economic demonstrations tend to become determinant (the economic aspect of advisory work). In many cases the discovery is first accepted by the "advanced" farmers and subsequently *disseminated more slowly* to the mass of farmers. The best system of disseminating improvements is that which, for a given agricultural population, disseminates the discovery in the shortest time and at the lowest cost.

155. The progress of discovery implies the organisation of contact between all those who contribute towards the march of progress — the inventor, the specialist adviser, the general adviser, the advanced farmers, the broad mass of farmers. The adviser is an intermediary between the research worker and the farmer ; he fills the role of a "liaison officer" with a double mission : that of informing the research worker of practical needs and that of disseminating the research worker's findings to farmers. "Stages" can be organised between the laboratory and the practical application : agricultural schools (which can serve as experimental centres) ; demonstration centres ; pilot farms ; etc.

The contacts between the research worker and the specialist adviser are also of fundamental importance. The system adopted in the Netherlands and elsewhere, by which the adviser specialises and is located at the research centre, is especially interesting. The use of agricultural school farms as experimental centres has the great advantage of introducing these schools into the "chain of progress", and of ensuring that the agricultural teachers participate directly in this progress.

156. The relations between education and advice, and the distribution of functions between these two branches, raise a number of special problems.

In Germany and Switzerland, advisory work is controlled by the service for vocational training (the director of an agricultural school also directs the regional advisory service). In other countries, for example, Denmark and the Netherlands, these services are separated but co-operation between them is organised.

Should teachers undertake advisory work and vice versa ? It is difficult to give an "experimental" answer to this question, since the various systems are employed in environments which often differ considerably. The functions of the teacher and adviser are distinct, although in practice education and information functions may overlap.

a) To an increasing extent the task of the teacher is to "teach how to learn" and general education tends to occupy an increasingly important place in agricultural training. The adviser *teaches* the farmer new techniques[1].

b) The teacher prepares for "change" (receptivity to technical progress ; the adviser introduces the change.

c) The teacher is at the service of his pupils, the adviser at that of farmers.

d) Pedagogy is the basis of action for both teacher and adviser, but the former is concerned with pedagogy applied to the adolescent, while the latter is concerned with adult pedagogy.

Obviously the actions of the teacher and the adviser are complementary. The two services should be co-ordinated, but this does not mean that they must be combined. The adviser may perform certain educational functions because the synthesis which they entail helps to regulate action ; and agricultural schools must surround themselves with an organised network of contacts through their former pupils if they are to avoid being cut off from the rural world and the essential problems connected with the economic and social progress of those engaged in farming.

Section III. CO-ORDINATION AND DEVELOPMENT AREAS

157. "Development zones" have been set up in many countries and deal with basic activities which bring traditional patterns into question (land reform zones, internal settlement zones, irrigatable perimeters, etc.), with pilot operations intended to show the advan-

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[1] J. M. A. Penders (Netherlands) writes : "The teacher teaches 'to understand why', the adviser 'to know how'."

tages of certain forms of production or marketing, or with intensive action by the advisory services (pilot zones, model zones). International organisations (O.E.C.D., F.A.O.) make an important contribution to the study of pilot zones and to the preparation and execution of development projects.

Some countries have turned to a systematic policy of so-called "regional economies". France, where regional differences are particularly marked, has been divided into 21 "programming regions". A development plan will be established for each region within the framework of the national equipment and modernisation plan.

158. Development zones can provide an operational framework for the establishment of development plans and the co-ordination of intellectual investment.

Such plans can include :

a) the defining of regional production targets ;
b) forecasts of the development of the patterns of production ;
c) forecasts of changes in the agricultural population ;
d) development forecasts for the agricultural and food industries ;
e) forecasts of the evolution of distribution patterns ;
f) intellectual investment plan ;
g) material investment plan ;
h) general plan of investment and forecast calculation for regional agriculture.

159. The programming and co-ordination of intellectual investment can cover the various forms of investment considered in the preceding chapters : research, basic education, educational guidance, agricultural education (various types and stages), adult education, vocational and social development, vocational re-adaptation, agricultural advisory work dealing with production techniques, work study, farm management, the marketing of produce, rural home economics ; the work of bodies which undertake specific tasks related to education : friendly societies, social security organisations, co-operatives, agricultural credit societies, land reform organisations, rural improvement and equipment bodies, young farmers' movements, etc.

It is obvious that, if the growth of intellectual investment in agriculture is to be adapted to meet the needs of economic development and social justice, a place where men can meet and compare projects for such investment is a minimum necessity.

Chapter IX

INTERNATIONAL EXCHANGE OF KNOWLEDGE AND TECHNICAL CO-OPERATION

160. Economic growth entails the transfer of workers and capital from one sector to another within a country; it also entails transfers at the international level. Economists have devoted a considerable amount of time to studying exchange mechanisms for goods and capital, but up to now they have taken little interest in the exchange of inventions, students, technicians, engineers, teachers, etc., or in the effects of different types of international exchange of knowledge on national and global growth.

The modern form of transferring knowledge is represented by "technical co-operation" between the more and the less developed countries. We deal here very briefly with *(I)* the exchange of knowledge in the strict sense, and *(II)* technical co-operation[1].

Section I. INTERNATIONAL EXCHANGE OF KNOWLEDGE

161. The international exchange of knowledge may take several forms: participation of countries in international organisations; individual participation at international courses, conferences and congresses; "pairing" of universities and other educational and research establishments, which facilitate exchanges of farm workers, farmers, students, teachers and experts. The exchange of knowledge can be organised both under bilateral or multilateral contracts.

162. The "commercial" form of exchanging knowledge concerning inventions is represented by the international trade in patents. Patents to protect the inventor during a certain period have been adopted throughout the world. The International Patents Institute[2] recently set up a "central index" and an international classification system was effective as from the 1st July 1959.

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[1] This chapter is only an outline and it is proposed in the future to complete it by a more detailed study.

[2] International Patents Institute, 97 Nieuwe Parklaan, The Hague, Netherlands.

An international conference[1] held in Paris from 21st November te 2nd December 1961 led to the preparation of the "Convention of Paris for the protection of new varieties of plants". This convention is designed to ensure that the rights of the discoverer of a new variety are recognised. It was signed by five countries (the countries of the European Economic Community except Luxemburg) and will be signed by a number of other countries in the near future.

163. A number of international courses deal more specifically with intellectual investment in agriculture. Such courses are: The international course on the vocational training of agricultural teaching staff held in Zurich; the international course on methods and programme planning in agriculture and home economics held annually in Wageningen (Netherlands); the in-service training course for field advisers in Mediterranean countries held at Casalina (Italy); and the International Study Centre on methods and programmes for the promotion of rural youth work held at Herrsching (Germany).

The establishment of the "International Centre for Advanced Mediterranean Agronomic Studies" is a remarkable example of international co-operation. It pursues a threefold mission of further training for Mediterranean agricultural graduates, analysis of agricultural development and international co-operation[2]. The courses are at present divided between two Institutes — one at BARI (Italy) and one at MONTPELLIER (France). The first Session opened at the Bari Institute on 15th November 1961.

164. An international exchange of workers, young farmers and students has many advantages. It leads to technical, linguistic and social acquisitions; makes participants aware of the problems of international co-operation; contributes to character formation and the development of personality.

"Many organisations have been developed to encourage, finance and administer planned international exchange visits"... but... "co-ordination between the various organisations is rare, and there is no affiliation to any international exchange organisation[3]".

Special efforts have been made since the end of the last war to encourage, on the one hand, the exchange of young European farmers with the United States and, on the other hand, bilateral exchange agreements have been concluded to facilitate the exchange of young farmers between European countries.

165. A study of the "International flows of students" has been

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[1] M. Bustarret: Results of the international conference for the protection of new varieties of plants. A.A.F. 17th January, 1962.

[2] The International Centre for Advanced Mediterranean Agronomic Studies, O.E.C.D. publication.

[3] Training of young farmers and farm workers. E.P.A./O.E.E.C. Food and Agriculture Documentation Series, No. 14, pages 115-116.

carried out by the Directorate for Scientific Affairs of the O.E.C.D.[1]. In 1958-1959 such movements were rather modest, and foreign students in the O.E.C.D. area represented no more than 2.5 per cent of the total student population of this area[2]. Foreign students studying scientific subjects represented slightly more than one-third of the total. Numerous other statistics relating to international flows of students will be found in the original O.E.C.D. publication.

166. The statistics on the flow of agricultural students give little cause for satisfaction. In 1958-1959 the O.E.C.D. area received a total of little more than 3,000 foreign agricultural students[3].

At the "Second European/North American Working Conference of Representatives of Higher Agricultural Education", held in Paris in November, 1962, Professor ROLFES presented a report on an enquiry into the exchange of academic staff and students in agricultural faculties[4]. From this report it appears that few exchanges of non-graduate students take place between the O.E.C.D. Member countries; exchanges being mainly at the post-graduate level. Two-thirds of the agricultural students from the O.E.C.D. area who study abroad go to the United States. Prof. ROLFES finds that although the exchange of academic staff is limited (about 80 persons) it is, relatively speaking, more satisfactory than student exchanges.

The Conference on higher agricultural education recommended that the O.E.C.D. "consider the desirability and possibility of setting up a clearing house to facilitate the exchange of students and staff".

Section II. TECHNICAL CO-OPERATION

167. In a speech on the 20th January, 1959, President TRUMAN brought forward the idea of sharing the knowledge accumulated in the more advanced countries with those in course of development. The Technical Assistance Charter resulted from Resolution 222 A, which was voted for by the Economic and Social Committee of the United Nations. At the present time the more advanced countries devote varying proportions of their national income on aid to countries in course of development, and a varying portion of the overall aid is devoted to "intellectual" co-operation[5]. The main burden is borne by the large industrialised countries.

Throughout the entire world, aid financed from public funds maintains 25,000 scholarship-holders and 52,000 experts each year. Mr. Paul HOFFMAN, Director of the United Nations Special Fund, estimated that one million persons would be required to promote the development of 1,250 million people in 100 under-developed countries[1]. Of the total amount of world technical assistance, bilateral action is four times as great as the multilateral action of the United Nations[2].

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[1] The policy of economic growth and investment in education : Vol. V. International flows of students, O.E.C.D.

[2] Op. cit. page 11.

[3] Op. cit., page 34-35.

[4] O.E.C.D. Documentation Series in Food and Agriculture, No. 61.

[5] For example, France devoted 2 per cent of her annual national income to aid for countries in the course of development. Technical co-operation comprises about 25 per cent of the total aid granted to Africa and Madagascar.

168. Sharing knowledge can be effected in several ways : reception by the advanced countries of students and "cadres" (for varying durations) ; supply of documentation, teachers and experts to countries in the course of development, etc.

Knowledge, when within the field of basic science, is regarded as a "free commodity" which is easily transferable. The major problem for developing countries is the adaptation of basic scientific principles to their specific conditions. According to S. KUZNETS, it seems that one of the essential needs of under-developed countries is to obtain workers specialised in adapting the existing mass of knowledge to the conditions and problems specific of these countries[3].

An urgent need in countries in the course of development is to organise a system of intellectual investment adapted to the requirements of economic and social development. The basic question for the economist is : What kind of education, from the quantity and quality points of view, does a community need to ensure its development ? (A. LEWIS). The O.E.C.D. has issued a series of studies on this subject[4].

169. We have said that the percentage of foreign students in the O.E.C.D. area is relatively low compared with the total number of students. Nevertheless, the assistance given to developing countries by this area is of fundamental importance. In 1958-59, it "had some 50,000 students from Latin America, the Middle East, Africa and Asia, compared with some 7,000 students from these regions in U.S.S.R. and 3,500 in Japan[5]". The United States, followed by France, received the highest percentage of foreign students (38 per cent and 14 per cent respectively) compared with the total number received in the area. But the highest percentages of foreign students compared with the total number of students registered in a single country are found in Austria and Switzerland (31.9 per cent and 31.6 per cent respectively).

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[1] F. PERROUX : L'Economie des Jeunes Nations, P.U.F., p. 161.

[2] Op. cit., p. 102.

[3] A. PAGE : "L'Investissement intellectuel Tiers Monde" — January/June 1962, p. 105.

[4] O.E.C.D. The policy of economic growth and investment in education. Vol. III. The Challenge of Aid to Newly Developing Countries.
— F. M. HARBISON : The Strategy of Human Resource Development in Modernizing Economies.
— W. Arthur LEWIS : Priorities for Educational Expansion.
— J. VAIZEY : Some of the Main Issues in the Strategy of Educational Supply.
— J. TINBERGEN and H. C. BOS : The Global Demand for Higher and Secondary Education in the Under-developed Countries in the next decade.

[5] International Flows of Students : p. 11.

Complete statistics are not available to enable an evaluation of the role of the advanced countries in training agricultural graduates for the developing countries. In 1958-59, the percentage of African students registered for courses in scientific subjects compared with the total number of students was 26.2 per cent in Germany and 20.6 per cent in France. The percentage registered in agriculture, compared with the total number of African students registered for courses in scientific subjects, was 12.5 per cent in France and 19 per cent in Germany[1]. These figures show that France and Germany train relatively few scientists for Africa and, more especially, relatively few agricultural graduates, although agriculture is the predominant sector of African economy.

170. During the Seminar organised by the O.E.C.D. on "Intellectual Investment in Agriculture in Relation to Economic and Social Development" Mr. MASSON presented an outstanding paper on the different forms of international technical co-operation in agriculture and the adaptation of research and education in advanced countries with a view to facilitating this co-operation.

Intellectual investment in agriculture in developing countries has certain special features. In most cases, education is not adapted to the rural sector and advisory work, therefore, has no satisfactory general education as a basis. It therefore comprises both education and information (the networks are exclusively public and the information essentially technical in character). "Promotion" (or training for development) has the special task of selecting and training those engaged in agriculture who are capable of assuming responsibilities in economic development. Applied research and experimentation, like other forms of intellectual investment, call for graduates who, in most cases, are not available.

Mr. MASSON has underlined the trend towards an increasing demand for qualified agricultural workers in the developing countries, and the difficulty the advanced countries have in meeting this demand.

171. The fundamental problem with which we have to deal in this report is, in fact, the effect of the needs of developing countries on the patterns and orientation of research and education in the advanced countries.

The first task would consist in clearly defining the needs of developing countries in respect of intellectual investment in agriculture, so that the forms of assistance to be provided by advanced countries may be determined. Statistics, research and basic studies are lacking in this field and carefully planned development programmes for rural education and advice are rarely prepared. Nevertheless, "An estimate of the overall needs of qualified staff in the countries in course of economic development would facilitate the establishment of training plans in the advanced countries, and would serve as a basis for the adaptation of research and teaching in these countries"[1].

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[1] International Flows of Students : p. 21.

172. For national Institutes, technical co-operation raises problems concerning the reception of students, adaptation of curricula, credits, and the provision of teachers for the developing countries for varying periods. These problems are added to by those arising from the considerable increase in the number of students in the advanced countries themselves. They can only be properly solved to the extent that the number of teachers available in these countries exceeds national requirements by as much as 10 per cent[2].

173. D. J. Aitken is of the opinion that "a greater measure of co-ordination, and even of centralisation, may be needed to achieve the most effective results. It may, for example, be found practical not to disperse students of agriculture from the developing countries among a dozen or more faculties and colleges but to bring them together in one or two institutions only. This would help to provide overseas students in numbers sufficient to warrant the introduction of appropriate modifications in courses of study and would also help to create a body of teaching staff familiar with the particular academic needs of these students, as well as with the personal problems they are likely to encounter. Such selected institutions, and some already exist, would also specialise in aspects of their fields of study of particular relevance to the needs of the developing countries. I think primarily of this co-ordination as taking place within a given country, but it may also be useful to explore the possibility of similar co-operation between the institutions of several 'receiving' countries".

174. Concluding his study on "The economy of young nations", F. Perroux refers to the lack of men and emphasizes its consequences. As far as graduates and technicians are concerned, the relations between the more and less advanced countries are characterised by a "two-fold shortage" : the acute, dramatic shortage of the new nations ; the pressing shortage of the old nations who have to cope with their own rate of growth and level of development[3].

The effort initiated in the field of "intellectual investment" will have to be considerably expanded if the needs of global economic growth are to be met.

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[1] Annex II, Section K.

[2] D. J. Aitken — "General problems of training under-graduate and post-graduate students from developing countries". O.E.C.D. Food and Agriculture Documentatoin Series No. 61.

[3] F. Perroux. Op .cit., p. 122.

CONCLUSIONS

This report is designed to consider the various aspects of intellectual investment in agriculture in relation with the overall system of education and economic and social development. This first attempt at such a synthesis calls for certain explanations and *addenda*.

Particular attention should be given to planning intellectual investment, especially to the planning of education. The attitude of countries to planning varies according to their traditions, degree of development and social and political philosophy. But all countries agree in recognising the advantages of social-economic forecasts.

Many countries have emphasised the value of trial forecasts in the field of education; others have gone further and have prepared genuine programmes (or plans) to ascertain those factors which are likely to hinder educational development, and to take the necessary measures in time. We have endeavoured in this report to make a contribution to the establishment of a methodological basis for the planning of agricultural education.

The preliminary report contained conclusions and recommendations which were submitted for discussion, especially by those participating in the seminar on the "Structure and Orientation of Intellectual Investment in Agriculture", held in Paris from 22nd to 26th October, 1962. These preliminary recommendations, after further explanation, variation or amendment, led to the final recommendations which appear in Annex II of the present report. These recommendations, numbering nineteen, provide a basis for future action. The author sincerely hopes that the action thus started will be pursued, and suggests that a report on the evolution of intellectual investment in agriculture in the O.E.C.D. Member countries be prepared annually.

Annex I

STATISTICS OF INTELLECTUAL INVESTMENT IN AGRICULTURE

Table I. Distribution of government expenditure affecting agriculture and food in 1955 or 1955-56
Table IIa and IIb. Intellectual investment in agriculture as a percentage of the gross agricultural product per hectare and per farm
Table III. Financing intellectual investment in 1960
Table IV. Intellectual investment in agriculture in the European Economic Community
Table V. Structure of intellectual investment
Table VI. Efficacy of intellectual investment

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Statistics concerning intellectual investment are fragmentary, dispersed and unreliable.

It is very desirable that measures be taken to improve and centralise such statistics, in order to allow international comparisons to be made.

The statistics contained in the following pages are used to show the extent of such investment and certain of them, already out-of-date, are given solely to illustrate this report.

TABLE I. PERCENTAGE OF TOTAL GOVERNMENT EXPENDITURE ON AGRICULTURE AND FOOD IN 1955 OR 1955/56 DEVOTED TO RESEARCH, EDUCATION AND ADVISORY WORK

Austria	9
Belgium	38
Denmark	36
France	5
Germany	11
Greece	5
Iceland	9
Ireland	6
Italy	6
Netherlands	15
Norway	5
Sweden	12
Switzerland	7
United Kingdom	3

Source : O.E.E.C. — Agricultural Policies in Europe and North America — July 1957. Tables II, p. 443.

TABLE IIa. INFORMATION ON THE EXTENT OF NATIONAL EXPENDITURE ON RESEARCH, EDUCATION AND ADVISORY WORK IN 1955 OR 1955/56

COUNTRY	% OF GROSS AGRICULTURAL PRODUCT	PER HA. OF AGRICULTURAL LAND IN DOLLARS	PER FARM OF 5 HA. AND OVER (IN $)
Austria	1.1	1.8	25
Belgium	1.6	6	99 [2]
Denmark	0.5	1.4	27
France	0.4	0.6	13
Germany	0.9	2.1	38
Greece	0.1	0.2	5 [2]
Iceland	2	3.9	109 [1]
Ireland	0.9	0.8	17
Italy	0.4	1	24 [2]
Netherlands	2.3	7.7	126
Norway	2.2	5.4	85 [2]
Sweden	2	2.6	53
Switzerland	0.9	2.6	36 [2]
Turkey	0.2	0.2	7 [2]
United Kingdom [3]	1.2	2.2	83
Average	1.1	2.6	49.8
United States	0.8	0.3	23
Canada	1.9	0.6	60
Average	1.1	2.3	48

1. The expenditure applies to all farms.
2. Farms of under 5 ha. comprise more than 20 % of the agricultural area.
3. Expenditure on Higher Agricultural Schools is not included.

Source : O.E.E.C.

TABLE IIb. RELATIVE EXTENT OF PUBLIC EXPENDITURE ON INTELLECTUAL INVESTMENT IN CERTAIN COUNTRIES AS A PERCENTAGE OF THE GROSS AGRICULTURAL PRODUCT (1959/60)

COUNTRY	GROSS AGRICULTURAL PRODUCT	PUBLIC EXPENDITURE ON INTELLECTUAL INVESTMENT	%
	1	2	
Belgium [1]	34,000	736	2.2
Greece [2]	25.000	197	0.8
Ireland [3]	130.000	1,631	1.25
Netherlands [4]	3,400	84.8	2.5
Portugal [5]	15,500	77.7	0.5
Spain [6]	—	322.9	
United Kingdom [7]	850	15.6	1.8

1. Millions of Belgian Francs.
2. Millions of Drachmas.
3. Thousands of Pounds.
4. Millions of Florins.
5. Millions of Escudos.
6. Millions of Pesetas.
7. Millions of Pounds.

Source : O.E.C.D.

Table III. FINANCING OF INTELLECTUAL INVESTMENT

COUNTRY	YEAR	RESEARCH		EDUCATION		ADVISORY WORK		TOTAL		TOTAL PUBLIC AND PRIVATE CREDITS	$\%\frac{P_r}{P_u}$
		P_u	P_r	P_u	P_r	P_u	P_r	P_u	P_r		
Belgium[1]	1960	291	23	427	—	17	5	735	—	—	—
France[10]	1960	32.11	—	40.95	—	49.42	—	122.48	—	—	—
Greece[2]	1960	90	—	32	—	75	—	197	—	—	—
Ireland[3]	60/61	504	—	450	—	677	—	1631	—	—	—
Netherlands[4]	1960	27.5	5.5	36.3	—	21	2	84.8	7.5	92.3	9
Portugal[9]	1960	42	3.5	24.2	0.4	7.4	0.6	73.6	4.5	78.1	6.1
Spain[5]	1960	94.56	6.2	127.78	11.02	100.65	—	322.9	17.22	340.21	5.3
Sweden[6]	1960	31	16	47	2	73	5	151	23	174	15
Switzerland[7]	59/61	8.5	350 à 400	10.3	—	5	9	23.8	—	—	—
United Kingdom[8]	60/61	8.4	—	3.2	—	4	—	15.6	—	—	—

1. Millions of Belgian Francs.
2. Millions of Drachmas.
3. Thousands of Pounds.
4. Millions of Guilders.
5. Millions of Pesetas ; funds for administration only.
6. Millions of Crowns.
7. Millions of Swiss Francs.
8. Millions of Pounds.
9. Millions of Escudos.
10. Millions of Francs.

Source : Questionnaire B. Pu = PUBLIC ; Pr = PRIVATE.

TABLE IV. INTELLECTUAL INVESTMENT IN AGRICULTURE BY COUNTRIES OF THE EUROPEAN ECONOMIC COMMUNITY

CATEGORIES		BELGIUM	FRANCE	GERMANY	ITALY	LUXEMBOURG	NETHERLANDS
Public expenditure in millions of $ USA (1956)	1	10.29	8.56	34.14	6.04	0.22	12.96
Per active agricultural population	2	29.40	1.71	8.16	0.86	6.28	25.41
Per hectare	3	5.90	0.22	2.40	0.29	1.50	5.58
Intellectual expenditure as a % of total public expenditure (1957)	4	38	5	11	6		15
As a % of gross agricultural product	5	0.9	0.2	0.7	0.1		
As a % of investment in tractors and machinery	6	40	2	10	5		1 50

NOTES

1. This expenditure concerns public funds devoted to research, education and advisory work.

2. The countries of the European Economic Community spend each year between $1 to $25 per head of the active agricultural population. In each country, the cost of training and informing those engaged in farming only represents a very small part of the costs of the trained man, but between one country and another the disparities are considerable.

3. The countries of the European Economic Community spend from $0.2 to $6 per hectare of agricultural land (the disparity is 1 to 30).

4. Public funds devoted to intellectual investment represents from 5 per cent to 40 per cent of total public expenditure.

5. Intellectual investment represents from 0.1 per cent to 1 per cent of the gross agricultural product.

6. Intellectual investment is, relatively, much smaller than "capital" investment.

7. The disparity in the intellectual investment of countries of the European Economic Community is particularly striking. Expenditure on intellectual investment per head of active agricultural population is greatest in the more highly industrialised countries of Northern Europe.

Source : "Principales conditions de production de l'agriculture des pays membres de la C.E.E." (p. 525 et s.).

TABLE V. DISTRIBUTION OF EXPENDITURE BETWEEN RESEARCH, EDUCATION AND ADVISORY WORK (PERCENTAGE) IN 1955/56

COUNTRY	RESEARCH	EDUCATION	ADVISORY WORK
Austria	24	61	15
Belgium	14	74	12
Denmark	26	34	40
France	25	45	30
Germany	33	22	45
Greece	2	93	5
Iceland	20	24	56
Ireland	19	32	49
Italy	13	83	4
Netherlands	35	40	25
Norway	27	42	31
Sweden	29	45	26
Switzerland	34	64[2]	—
Turkey	27	23	50
United Kingdom	55	18[1]	27
United States	63	37	
Canada	56	20	24
Average	30	43	27

[1] Expenditure on university-level education not included.

[2] Includes advisory services.

Source : O.E.E.C.

TABLE VI. DENMARK : TRAINING GIVEN TO FARMERS AND THE FINANCIAL RESULTS OF THEIR FARMS

FARMERS' TRAINING	NUMBER OF FARMS	INCOME OBTAINED AS PER CENT OF CAPITAL INVESTED
Elementary Education	124	4.8
Higher general education	68	5.3
Agricultural School	116	5.4
Higher General Education and Agricultural School	102	6.4
Higher General Education + Agricultural School + Extended vocational training	36	7.5
	410	5.4

NOTE : Many examples of this type have been published to prove the efficacy of the education received by a farmer. For a better interpretation it would be desirable to know the average size by category of farm, to evaluate if *the result of management* is not combined with *the result of structure* (size of the farm). Or, better still, to estimate under which conditions *the result of management* can overcome *the result of structure.*

Source : Quoted by G. ARDANT "Le Monde en Friche" p. 182 et s.

Annex II

SUMMARY REPORT OF THE SEMINAR ON THE STRUCTURE AND ORIENTATION OF INTELLECTUAL INVESTMENT IN AGRICULTURE

Seminar held at O.E.C.D. Headquarters,
Paris, from 22nd to 26th October, 1962.

INTRODUCTION

1. The Seminar was attended by fifty delegates representing nineteen Member countries as well as five representatives of international organisations.

2. Mr. Kristensen, Secretary General of O.E.C.D., in welcoming the participants to O.E.C.D. Headquarters underlined the importance of the subject of the meeting and stressed how a better use of human resources could contribute towards the carrying out of policies for economic growth.

3. Mr. Pisani, Minister of Agriculture for France, who delivered the Opening Address, underlined that intellectual investment in agriculture has three main objectives : to master nature, to master economic phenomena and to train men.

4. Mr. Porter, Director for Agriculture and Food, drew attention to the place of the seminar in the overall programme of the O.E.C.D. Committee of Agriculture and pointed to the contribution it could make to the objectives of the Organisation in the agricultural sector.

5. The conclusions and recommendations of the Seminar, which are set out in the following paragraphs, were derived from the discussions on the papers presented by guest speakers. The conclusions and recommendations are framed so as to provide as wide a coverage as possible of the diverse conditions and stages of development of Member countries, and at the same time to allow for their interpreta-

tion in the light of the special conditions of th eindividual countries themselves.

CONCLUSIONS AND RECOMMENDATIONS

A. COLLECTION AND PUBLICATION ON A REGULAR BASIS OF STATISTICS OF INTELLECTUAL INVESTMENT IN AGRICULTURE

6. The importance and urgency of obtaining adequate statistics relating to this subject was emphasized. It was recommended that O.E.C.D. set up an *ad hoc* group consisting of representatives of interested bodies, including economists and statisticians. This group would have the task of defining the conceptual framework and standardising the collection, analysis and presentation of data in order to facilitate international comparisons. The work of this group should be conducted in consultation with other interested international organisations such as F.A.O., UNESCO, and E.E.C. Insofar as is possible, the studies under each sector (research, teaching, advisory work) should be initiated under the O.E.C.D. 1963 Operational Programme in Agriculture.

B. DEVELOPMENT OF BASIC RESEARCH ON INTELLECTUAL INVESTMENT IN AGRICULTURE

7. This research should deal in particular with the volume and structure of intellectual investment, the relation between the different categories of intellectual investment, the pedagogic and sociological basis of education and advisory work and the purpose, organisation and methods of research, education, advisory work, youth movements, and so on. This research would need to be undertaken in conjunction with other kinds of research, in particular, research concerning economic and social development. It should aim, particularly, at developing improved methods capable of bringing about the needed changes in the attitude, outlook, and behaviour of those engaged in farming; changes which are one of the conditions for economic and social development. Such research might be implemented by specialised or non-specialised bodies, by national or international bodies. The International Centre for Advanced Mediterranean Agronomic Studies could play a significant role. The Seminar underlined the fundamental importance of an early study of pedagogic problems as applied to agricultural teaching. This would necessitate the formation of a working group.

C. COUNTRIES SHOULD BE STIMULATED TO MAKE FORECASTS OF THEIR AGRICULTURAL INTELLECTUAL INVESTMENT REQUIREMENTS

8. Such forecasts provide an important means of estimating the effort that will have to be made and of guiding action in relation

to the supply of manpower. In those countries which have elected to plan their economic development, the planning of intellectual investment in agriculture should be made within the framework of the overall intellectual investment plan, which in turn should bear a relation to the overall development plan.

9. It is desirable to define and publicise methods of estimating the supply of and demand for labour at given stages of economic and social development, in order to guide action in the field of intellectual investment.

D. ATTENTION SHOULD BE GIVEN TO THE NEED TO REDUCE THE PRESENT DISPARITIES IN INTELLECTUAL INVESTMENT

10. An examination of available statistics shows great disparities in intellectual investment in individual countries, to the detriment of the rural population. A direct economic approach defines additional intellectual investment in agriculture on the basis of a comparison of the returns expected in the different sectors.

11. The statistics also show that great disparities in intellectual investment in agriculture exist between countries. In this connection a special effort to develop such investment is needed in Mediterranean countries. To ensure efficient planning, and in order to co-ordinate the overall planning of education with agricultural teaching, it is recommended that O.E.C.D. and Mediterranean countries take steps to plan agricultural teaching in co-operation with the Mediterranean Regional Project of the Directorate for Scientific Affairs.

E. WITHIN THE FRAMEWORK OF INTELLECTUAL INVESTMENT IT IS URGENT THAT AN IMPORTANT PLACE BE GIVEN TO THE "FURTHER TRAINING" OF ADULTS, INCLUDING A DETAILED STUDY OF SUCH TRAINING

12. This matter was not considered in any great detail during the Seminar. However, particular emphasis was placed on the importance of such training for adults who have not benefited from scholastic training in their youth. This is of greatest significance in countries in which agricultural education has until lately been poorly developed.

F. NEED TO FACILITATE VOCATIONAL MOBILITY

13. Economic growth implies vocational mobility and the training of an ever-increasing proportion of skilled workers. The attainment of these ends can be facilitated by systems of vocational guidance, and flexible systems of education to permit the orientation, and re-orientation, of pupils. The attention of countries was drawn to the necessity to facilitate vocational changes in order to attain the

desired economic growth, on the one hand, and make these changes as humane as possible, on the other. This can be done by means of a training that permits standards of living to be maintained or increased.

G. RISK OF A SHORTAGE OF QUALIFIED TEACHERS AND STAFF

14. Taking account of the great need in Europe for qualified personnel in research, in the many forms of education and in advisory work, and for the purposes of technical co-operation, attention was drawn to the shortage of qualified staff noted in some countries. It is necessary to increase and adapt training resources, and to amend the status and remuneration of qualified personnel, if the requirements of Member countries and the needs of technical co-operation are to be satisfied.

H. ORGANISATION OF INTERNATIONAL UNIVERSITY CENTRES

15. At the university level, O.E.C.D. could contribute by facilitating the advancement of agricultural sciences within certain disciplines and in certain geographical areas. The establishment of the International Centre for Advanced Mediterranean Agronomic Studies is an example of such activity. The Institutes of this Centre could, through their teaching and research, play an important part in the economic and social development of that region, notably through the in-service training of "cadres" and teachers.

I. NEED FOR CO-ORDINATING TECHNICAL AND ECONOMIC RESEARCH IN AGRICULTURE

16. The participants considered that a general review of the organisation and orientation of European and North American agricultural research would be of great benefit, and that the O.E.C.D. should initiate periodic meetings between the directors of agricultural research services, as it has already done for the educational and advisory services.

17. The question of liaison between technical and economic research was a matter of very special interest, as was that of the organisation and orientation of economic research in Europe and North America. The participants noted with interest that the proposed O.E.C.D. Operational Programme in Agriculture for 1963 provided for :

a) A meeting of experts to review research in agricultural economics ;

b) A seminar to discuss co-operation between research in agricultural natural sciences and agricultural economics.

J. NEED FOR CO-ORDINATING ACTION CONCERNING TECHNICAL, ECONOMIC AND SOCIAL INFORMATION FOR RURAL POPULATIONS

18. Agricultural advisory work tends more and more towards a general plan of technical, economic and social information for the rural population. In the last few years, O.E.C.D. has paid marked attention to advisory work with emphasis on farm management. This emphasis should be continued and aimed at adapting the structure of advisory services to the development of management techniques and the marketing of agricultural produce.

K. NEED FOR A STUDY OF THE PROBLEMS OF TECHNICAL CO-OPERATION IN AGRICULTURE BETWEEN THE MORE ADVANCED AND THE LESS ADVANCED COUNTRIES

19. The responsibility of advanced countries in the field of technical co-operation demands a co-ordination of activities and an improvement in methods of operation. An estimate of the overall needs of qualified staff in the countries in course of economic development would facilitate the establishment of training plans in the advanced countries, and would serve as a basis for the adaptation of research and teaching in these countries.

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Annex III

SUMMARY REPORT OF THE AD HOC MEETING OF EXPERTS ON THE SPECIFIC PROBLEMS OF MEDITERRANEAN COUNTRIES IN THE FIELD OF INTELLECTUAL INVESTMENT IN AGRICULTURE

Held at O.E.C.D. Headquarters,
Paris, on 7th and 8th June, 1962.

CONCLUSIONS AND RECOMMENDATIONS

1. The group of experts stressed their great interest in the draft report of a study on intellectual investment in agriculture, prepared by Professor L. **Malassis** (France), which was presented during the meeting. The importance of viewing such investment in relation to overall intellectual investment and the economic and social development of countries was emphasised. It was evident that the study was of such importance that it should be pursued and finalised as soon as possible. In effect, the study opens the way to much research which would be of continual value for the development of intellectual investment in agriculture, and which should be the objective of a long-term programme by the O.E.C.D.

2. The experts agreed the basic conclusions and recommendations contained in the draft report, and in particular underlined the urgent need to supervise the development of agriculture, by forming an ad hoc commission in each country to be responsible for the preparation of statistics concerning education, research and advisory work. Such data should be published regularly in the O.E.C.D. Bulletin "Agricultural Statistics".

3. The group of experts noted that in the field of higher agricultural education (International Centre for Advanced Mediterranean Agronomic Studies) and of advisory work (In-Service Training Courses for Field Advisers from the Mediterranean Countries, held at

Casalina, Italy) measures had been taken to develop international co-operation. The urgency of studying means to promote similar measures in the field of agronomic research was stressed.

4. The experts considered that forecasts of the evolution of the agricultural population, of the number of farmers and farm workers to be trained, and of the levels of training required, as well as the means necessary, etc., would assist and stimulate the development of intellectual investment in Member countries. Within these perspectives, methods of planning could be perfected and made known.

5. The expert meeting were keenly interested in the information provided by Professor **Heady** (United States). It asked that a report, along the lines of that prepared by Professor **Malassis** for the European countries, be prepared on the countries of North America.

6. In view of the importance of rapidly establishing a co-ordinated policy for intellectual investment in agriculture, the group of experts strongly recommended that a team comprising representatives of agronomic research, higher agricultural education, vocational training in agriculture, agricultural advisory work and agricultural information, be formed in each Mediterranean country. The members of these teams should be guided by a co-ordinator and should be trained in the techniques of planning programmes in their particular field.

7. The group of experts strongly recommended that all those who will be required to take responsibility in the planning of intellectual investment in agriculture should follow the training courses designed to train experts in the policies of investment in human resources (training courses for human resource strategists), which would be organised in 1962 and 1963 by the Directorate for Scientific Affairs of O.E.C.D.

8. The group of experts stressed that steps should be taken by the Division for Technical Action of the Directorate for Agriculture and Food, and the Planning and Development Division of the Directorate for Scientific Affairs, to ensure that the programmes of the zones of Epirus and the Peloponnesus (Greece) for the development of intellectual investment in agriculture are co-ordinated with the overall plans for intellectual investment in education, and that pilot studies on overall intellectual investment in agriculture be established in other development areas, for example, the Metaponto zone in Italy.

9. The group of experts learnt with great interest of the work carried out by the Directorate for Scientific Affairs under its "Mediterranean Regional Project". In view of the importance of agriculture in the economy of Mediterranean countries, and of the need to develop agricultural education in these countries, it is essential that close relations be established between the Division for

Technical Action of the Directorate for Agriculture and Food and the Planning and Development Division of the Directorate for Scientific Affairs, and in particular that the person responsible in each country for agricultural education should participate in the work of the national teams of the "Mediterranean Regional Project" of the Directorate for Scientific Affairs, in order to ensure co-ordinated action.

10. The members of the group underlined their interest in provision being made for them to meet again during 1963, in order to analyse the progress made and to define a future programme.

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